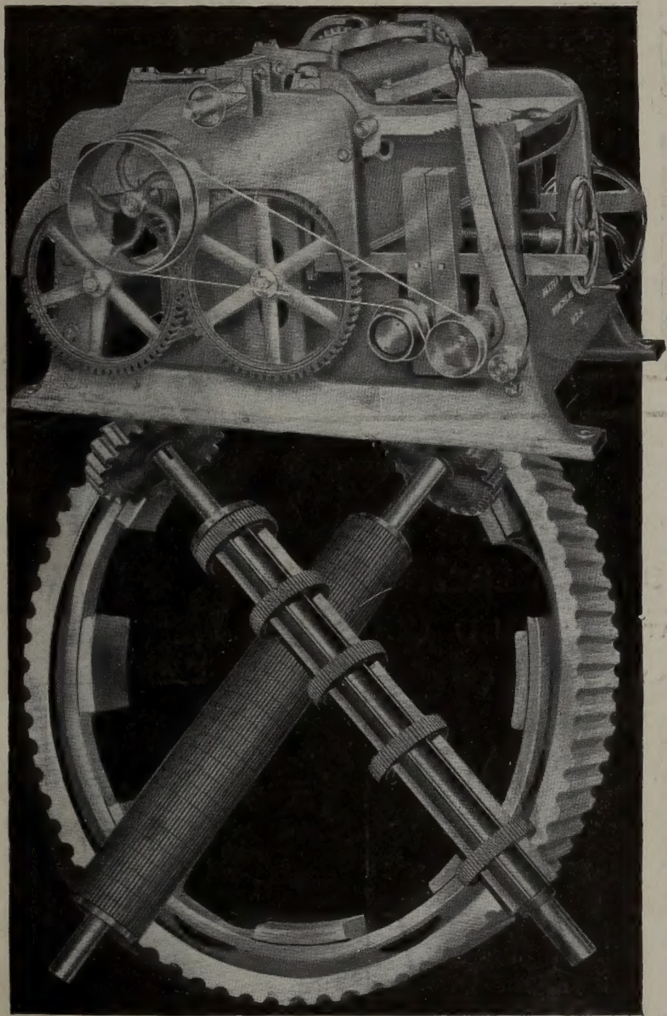
Volume Thirteen TORONTO, JANUARY, 1913 Number One

Canadian Woodworker

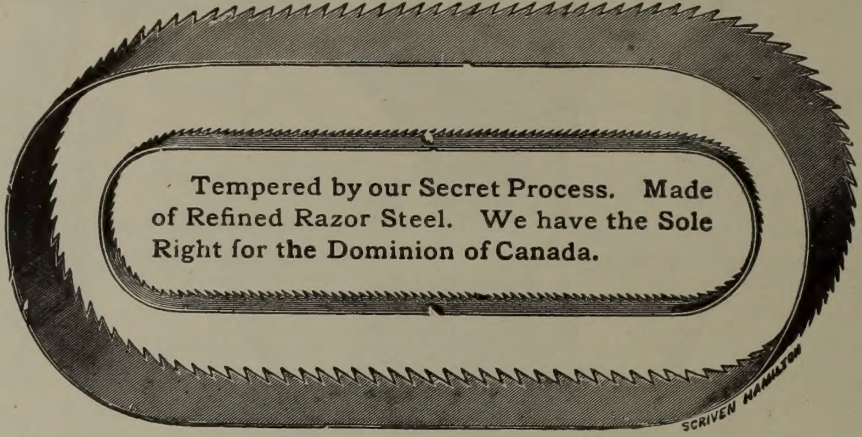


Maple Leaf Saws

MADE BY

LARGEST SAW MANUFACTURERS UNDER THE BRITISH FLAG

We manufacture
Circular Saws
Gang Saws
Mill Saws
Band Saws
Cross Cut Saws
Buck Saws
Saw Setts
etc.



"Maple Leaf" Saws are the best-tempered saws made

We manufacture high-grade **Band Saws** of all Widths and Lengths

These Saws are made of Refined Razor Steel, and Tempered by our Secret Process; for Fine Finish and Temper are not excelled.

We are the only manufacturers in the world who export Saws in large quantities to the United States

Shurly-Dietrich Co., Ltd. **Galt, Ont.**

Western Warehouse and Office, Vancouver, B. C.

Cut Off Nine-Tenths of the Cost.

Add Most of it to the Proft.

When you make a large reduction in the cost of anything, the profit is not increased in exactly the same proportion. The price is bound to be somewhat less also. But in window frames, where the only competitor of the mill man is the hand workman—the carpenter—it doesn't make much difference in price to enable the mill to control the market.

That is what makes our **Perfect Window Frame Machine** such a great money earner for planing mills. It gives them a cinch on the frame business. While saving ninety per cent. of cost in making them, it ensures the mill man a profit that pays for the machine in a few months' run, and keeps on paying in like ratio as long as it is run. Where there is any market for window frames, the net earnings of a machine may safely be counted as from 50 to 75 per cent. of its cost, while often they go 100 per cent., and even more. Have you, right now, Mr. Mill Man, any machines in your place that are doing better? Any doing as well? Any doing half as well?

Machine does everything shown above.

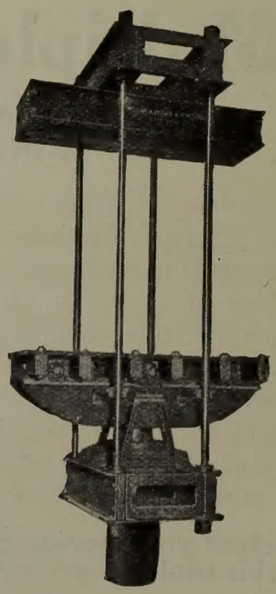
Here is a proposition well worth study. Let us put the facts before you.

Smith & Phillips Mfg. Co.

412-422 N. Sangamon St., Chicago

Our combination Machine for Stair Routing, Edge Jointing, Sash Grooving and Light Shaping is a four-time winner.

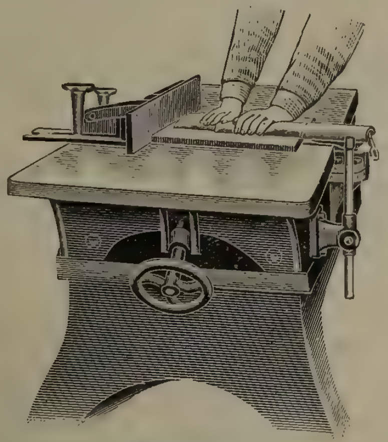
Hydraulic Veneer Press

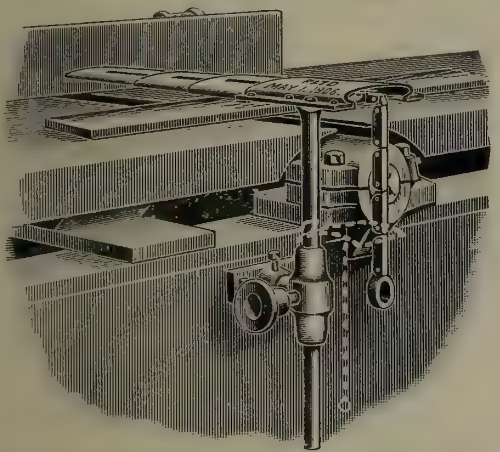


We build these presses in all sizes and styles for all kinds of Veneer work

Write us for Prices

William R. Perrin & Company
Limited
TORONTO





False Economy

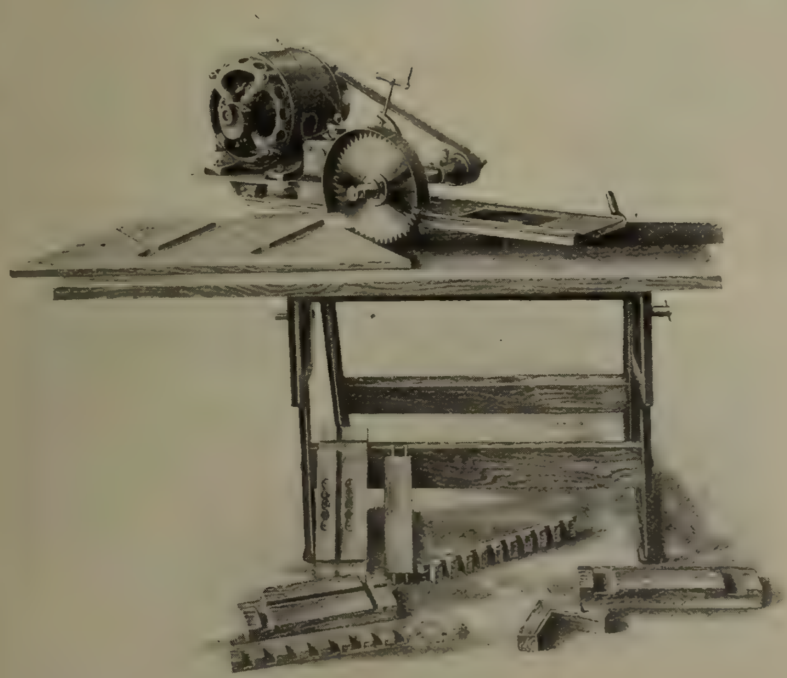
THAT only will fairly describe the policy of continuing the risk of accidents due to a neglect to furnish proper guards for Jointers, Wood Shapers, Band and Circular Saws and Stamping Presses.

Court records are constantly being made of cases where the comparatively trifling cost of these appliances are being saved only by incurring heavy damage verdicts with added law costs.

Save money by writing at once for Catalogue and information relative to Guards suited to your machines to

The Jones Safety Device Co.
LIMITED
152 Dundurn St., HAMILTON, ONT.

THE ELLIOT WOODWORKER



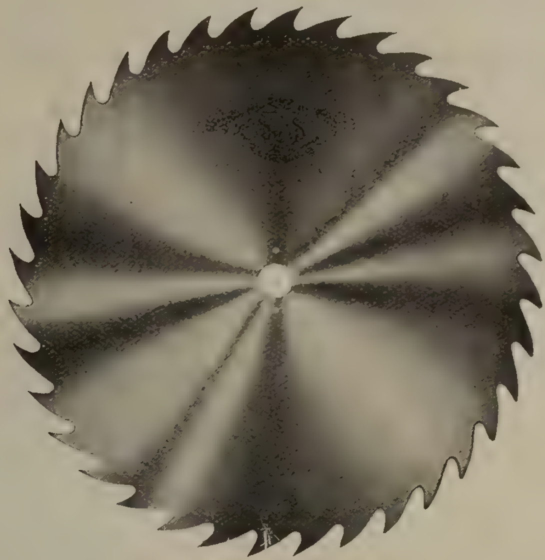
Patented Canada, 1910, Patents Pending U. S.

The illustration herewith shows the Elliot Woodworker, No. 2, set for mitering, also samples of work done on the machine. For cross-cutting and mitering, housing out stair strings and other routing, it works on the principle of a swing saw, the carriage, with motor and saw, being drawn to and fro by hand. For ripping the carriage remains stationary. It is a combination of eight machines in one. With it you can rip, cross-cut, miter, rabbit, groove, plow, bore, stick mouldings, grind tools, or almost any kind of work required. It is fitted with a motor, and can be run by any house current; it can be carried from room to room, or out-doors for cutting joists, rafters, etc. One of the greatest features of the machine is the stair routing—a 16-inch stair string can be housed out in twenty minutes. You can save 30 to 40 per cent. of your labor bill by the use of this machine.

Write for particulars to

W. A. ELLIOT
TORONTO, ONT.
Factory: Bathurst and College Sts.
Phone Col. 1496

When the Circular Saws in your Planing Mill are

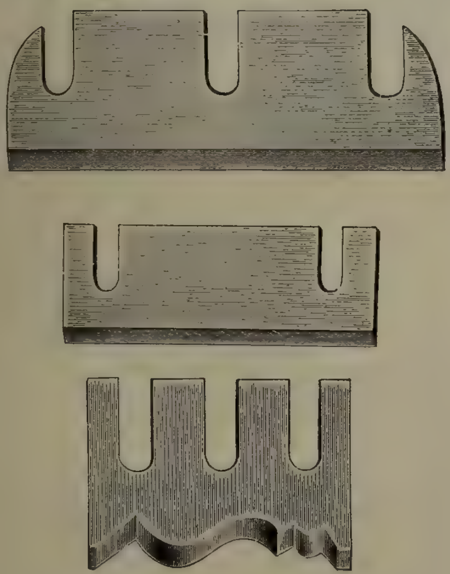


Simonds Saws

AND BEAR THIS TRADE MARK

The Guarantee of Quality made by our Company protects you and assures you a product that is the Height of the Saw Making Art.

Simonds Machine Knives



Are made in all styles and any desired size. Welded, Balanced, and Finished with the greatest care. Orders promptly filled. Standard sizes carried in stock.

Factory in Montreal

Simonds Canada Saw Co.

Montreal, Que **Limited**

Vancouver, B.C. **St. John, N.B.**

Canadian Woodworker

Canada's Only Woodworking Paper

Published in the interests of Planing Mills, Saw Mills, Furniture and Piano Factories, Implement and Carriage Works, Boxmakers and Coopers, Carpenters and Builders.

The Circulation extends from the Atlantic to the Pacific and covers thoroughly all classes of Woodworkers in this immense territory.

Wooodworker Publishing Co., Limited

Nicholls Building Toronto, Canada

United States: E. J. MACINTYRE, 4057 Perry St., Chicago.

SUBSCRIPTION RATE.

Canada, United States, $1.00; Great Britain, Australia 4s 6d.; other countries $1.50 per year. Advertising rates on request.

Vol. 13 January, 1913 No. 1

The Situation and Outlook

THE progressive interests identified with the field of this journal have every reason to be satisfied with the outlook for 1913. It may safely be asserted that at no previous time in the history of Canada's development has the industrial horizon been so clear. It is a case of " where every prospect pleases "—without any modifying after-thought. Canada is coming into her own in a measure that exceeds the most optimistic hopes of a generation—nay even a decade—ago.

The industrial achievements of 1912 bid fair to fade into insignificance compared with those of 1913. Not but what we have every reason to look back with feelings of satisfaction. One can only regard 1912 as a year of outstanding progress. All feelings of distrust that had existed since the depression of 1907 were not only overcome but forgotten. And it is gratifying to reflect that this great betterment was more or less universal. Trade returns from the densely populated manufacturing cities of European countries were uniformly good. All of this should have a most favorable effect upon the year's business in Canada.

The woodworking and allied industries cannot fail to receive a gerat impetus from the large amount spent on building operations last year. In this connection we need only refer the reader to the table of building statistics published on page 38. It is surely illuminating as to Canada's great progress that thirty-seven cities and towns should have spent a sum approximating $200,000,000. And the building record, after all, is only one branch of the constructional field. Corresponding activity obtained in railroad work, for instance. It is significant to mention that the three transcontinental roads, the C.P.R., C.N.R., and G.T.P., are entering upon the most comprehensive programmes in their history, having planned the building of 2,700 additional miles of track at a cost of some $40,000,000.

It is not only in the large fields, however, that the present year shows such promise. Nineteen hundred and thirteen will be the year of the small builder, and the woodworking industries will profit accordingly. In the building activity of the coming season small residences will figure largely. There are a number of contributing factors to this, of which the principal is that immigration is increasing largely and that the large rents obtaining in our cities and towns have turned the attention of householders throughout the country to the desirability of owning a home.

All these considerations, taken in conjunction with the fact that there is little disturbance in the political and labor worlds, force us to the conclusion that 1913 will be a record-breaker. Evidences are already coming to hand and news of expansion and extension comes from every quarter. As a single instance, take Toronto, which is considered the most normal city of the Dominion. During the first two weeks of 1913 the value of Toronto's building permits was double that of the corresponding period a year ago.

The woodworking industry cannot remain behind in the march of progress, even if it would. But there is no disposition to do so. Mills, works and factories have been turning out work in record manner. With a continuance of present favorable conditions, and an early start on construction in the spring, the 1913 receipts should be the greatest ever, both for master and man.

We have no hesitation in predicting that both from the national and industrial standpoint 1913 will be the year of Canada's greatest achievement. For the rest, in whatever sphere we may labor, whether executive or operative, success rests with ourselves. If we do not make the most of our opportunity at this stage of Canada's development, generations unborn will ridicule us for our stupidity, just as we ourselves have referred occasionally to the short-sightedness of those who have preceded us. The only thing is that the responsibility of our failure will be commensurate with the size of our opportunity.

Let us then co-operate in making 1913 a record year for Canada, being "of one mind, and of one mind good."

Canadian Door Manufacturers Must Prepare to Meet Competition

IN the last issue of the Canadian Woodworker it was pointed out that if the Canadian manufacturers of veneer doors hoped to keep the American doors out of Canada they would have to make doors that would stand up to all the conditions that might reasonably be expected of them. It was also pointed out, at that time, that some Canadian-made doors were failing to meet these requirements.

There are a large number of American door importers in Canada, one of whom invited a representative of this journal to inspect his stock, and it must be admitted that every American veneered door examined was in just as perfect a condition as the day it left the factory; but what is of most significance is the fact that these doors have been in stock upwards of a year and are standing up under a temperature of 70 degrees.

In the same stockroom we saw Canadian doors, made less than two months ago, that are shrinking so badly that a twenty-five cent piece can easily be put in the shoulders between the lock rails and mullions. This is a bad condition of affairs and we repeat that if this important trade is to be kept for Canadian manufacturers, we shall have to make as good or even better doors than our American cousins.

It is only fair to say that of all the pine doors ex-

amined the Canadian-made door is as good as, and in some lines much superior to, the imported door.

This is a question that has to be faced and faced squarely.

Too Much Green Hemlock?

THERE was a tremendous demand for hemlock joists and studding during 1912. In fact so great was the demand that a good deal of green material was used in some of the houses built for sale. At least so a certain plasterer says, and just now he is beginning to feel a little anxious as to how his work will show up in the spring. "When unsightly cracks appear it is the plasterer who gets the blame," he tells us.

Pursuing the subject farther, this same man made the statement that hemlock laths or studding should never be used in a good building as it always caused the plaster to turn a dirty yellow, which, in turn, even showed through paper.

Every man to his trade. We assure our plasterer friend that he need not expect to get all the blame if some of the work he did last year does crack and white walls show yellow spots. All builders know and are generally willing to admit that cracks are not always a sign of poor work on the part of the plasterer, but can usually be traced to shrinking of the joist, and in some instances to settlement.

Just the same we don't hold with any builder who works in a lot of green hemlock or any other green stock.

Knowledge of Plans and Details Valuable to Machine Hands

THE men who cut up material in woodworking factories to-day demand and get good pay. "Breaking out" is the term used in the trade, and the trade knows its worth and willingly pays just a little more for this class of help.

The whole reason is not—as many might suppose—the high price of lumber. There is another reason and one that enters very largely into the question: A first-class man engaged at this work can always be depended upon to keep the best side up; in other words he will prepare all the stock, either for the machine or the bench, so that it will present the best possible appearance when finished. That's the thing that counts to-day—combined, of course, with quickness.

Getting out stock now is not the simple task it was when lumber, either in the soft or hard woods, came to the factory of a grade seldom seen to-day. When lumber was cheap and clear any—or almost any—man about the place could be entrusted to take care of this job. Now it takes an expert to handle it. And they are very scarce.

The "breaker-out" in the woodworking factory needs to have an all-round knowledge of the particular business he happens to be engaged in, no matter whether it be a furniture factory, casket or box factory, or planing mill. He must know what will go and what will not. And very few men have had an opportunity of acquiring this knowledge. This is the chief reason why they are scarce.

A man with a good knowledge of details and blue prints is a handy man about a planing mill or furniture factory. Such a man will get out the material for a job, or for store or office fixtures, or for all the material required in a private house, and effect a saving that will more than make up for the extra pay he usually gets. It is a wonder more of our young woodworkers do not study plans and details more. Certainly it is a great help to a machine hand in his daily work and makes him of much more value to his employer. There was a time when the carpenter was the only woodworker who was expected to know much of plans and details, but the bright and ambitious machine hand will find it worth while to study the matter also.

First Aid in the Sawmill and Factory

By William Wright, Phm. B.

SOME general hints as to first aid will not come amiss to the readers of the "Woodworker" and will no doubt be appreciated by those employed in the larger as well as the smallest planing mills, factories or yards. Personally, I think that owners of such yards should place a few of the simpler remedies in a convenient place for use in case of emergency.

Should an accident of any kind occur the first duty is to at once send for medical aid, but in many cases the pain and suffering can be allayed by the use of the remedies kept. Let me mention two common accidents which are likely to happen at any time. A burn, for instance, may be treated successfully by the immediate application of the old time Carron Oil, which should always be on hand. The composition of this is linseed oil and lime water, or sweet oil may be used instead of the linseed. This may be applied at once. Ordinary baking soda, zinc ointment, zinc oxide and vaseline may also be used with safety. If clothing be on or near the burn this should be cut away at once, care being taken not to pull off the skin.

A cut from a saw or other sharp tools in use may be looked after at once by cleansing with a solution of carbolic acid—one teaspoonful of the acid to a pint of water—and then bandaged. Bleeding may be overcome by the application of a strong solution of chloride of iron, obtainable at any chemist's store.

One of the best applications in my experience consists of small threads of absorbent cotton placed over the cut or wound, a little zinc oxide powder lightly dusted on the cotton, and the whole covered with an application of collodion, which when dry forms a practically water and dirt proof dressing, and one of the most healing.

I might easily take up much valuable space in enumerating the individual accidents which occur, but in conclusion let me give a short list of what is most needed in the factory first aid chest:—Bandages of all sizes, absorbent cotton, adhesive plaster, absorbent gauze, carbolic acid and carbolic ointment, zinc oxide and zinc ointment, baking soda, carron oil, collodion—kept tightly corked, antiseptic powder, a couple of clean white enamel basins, and a pair of medium sized scissors. With these on hand even the most serious of wounds can be attended to at least temporarily.

In case of fainting or shock, aromatic spirits of ammonia—a teaspoonful in half a tumbler of water—may be advantageously used and should be kept with other remedies mentioned.

A by-law was recently passed by the Council of the city of Toronto, limiting the height of buildings in the city to 125 feet. This is a step in the right direction. It is not too much to hope that the future will see restrictions, limiting the height of all buildings to one and one-half times the width of the street on which they are erected.

Woodworkers' Stock-Keeping Methods

Absolutely Essential to the Successful Conduct of a Business to Have an Efficient System such as Outlined

An adequate system for keeping of stock is especially important in a woodworking plant, writes D. Geissler, in an article descriptive of German methods that have been employed satisfactorily. It is impossible to know the exact quantity of wood on hand unless there is some good system. In the interest of good management, and for the purpose of ordering certain kinds of lumber at the right time, it is of course necessary to know at all times the exact nature of the lumber supply on hand.

It is also desirable to know how much was used the previous year so as to make estimates for the coming year. In case of a fire the stock book is invaluable. The keeping up of such stock book is not an easy or simple matter by any means, yet with some little care and good will it is possible to keep a proper stock book and get good results. The following illustration covers a larger plant, while smaller yards can accommodate their system to their needs.

No. of log	Date received	Kind of wood	Length	Average diameter	No. of cu. ft. content	Price per cu. ft. for space	Value of timber	Source

Table A.—Entries of rough stock

When the lumber is received, taking for granted that it is received in form of uncut material, it is measured and marked with a number, the numbers being kept in rotation. Number, length, diameter, nature of wood and price are entered along with the date and number of source of supply in a round-timber book. The entries might be in the form given in Table A.

Long logs after cutting should be arranged again in corresponding lengths, putting equal lengths together if possible. Care must be taken, however, to keep the right numbers on the various lengths of log. Every part of the log receives an additional mark, however, namely: S for the end of the log; M for the center portion; Z for the third or top portion. The three sections of log No. 4, for example will read: 4S: 4M: 4Z.

As soon as the logs have been cut, the different boards are measured, and length, width and thickness marked on each one. Usually the man feeding the power saw can tend to this, as he has enough time, especially if the saw should cut hard wood. In addition, the cross-grain surface of the wood is marked both with the number and section of the log as also with a running number as the figure shows.

Day cut	Number of Log	Number of Board	Length ft.	Width in.	Thickness, in.	Cubic contents cu. ft	Day when used

Table B.—Entries for material as cut and used

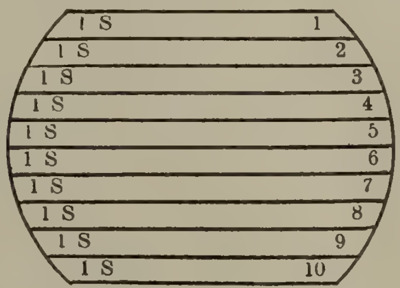
The log is then entered in the proper book for that kind of wood, as for example according to the entries shown in Table B. The cubic contents can be figured either from the length, breadth and thickness of each separate board or else from the entire log. The former method is preferable, as the boards, cut in various thicknesses, are often stored for years before being worked.

Heavy planks must season longer than thin boards, and when many boards are used in the shops it is easier to keep track of the number on hand. On the other hand it is also advisable to enter each thickness separately, keeping a page of the stock book for each thickness.

As the boards are used, the date is entered into the stock book. A pre-requisite for the success of the system is of course correct notice of all deliveries to the stock clerk.

More difficult is the stockkeeping of cut but rough edged stock. This cannot be numbered and stamped, and the best plan is to mark each board with length and breadth, and simply enter the total area of boards for the kind of wood and thickness on the page reserved for the same. If certain boards are needed, their length and width is noted, and the area figured from that, and subtracted from the total in the book.

Care must be taken that the same measurements are noted in the book when delivering boards as were noted when storing them in the yards. If this is not done there will be differences in the stock book, and the same will show a certain quantity of lumber on hand while in reality this is not in the lumber yard at all. The error arises from the difference in measurement.



Designating boards as to number, section and series

A different system must be used for planed boards. Here the thickness and width are permanent, and if the boards should be cut the same length all that is necessary is to enter the number of boards and their length, breadth and thickness. If the length of the different boards differs, as is the case in most plants, the over all or total length of boards must be entered, and the various lengths subtracted as they are used in the plant. A valuable aid will be found in the practice of marking the length on each board when storing it in the yards. The length has to be measured any way, and the result on the books will be more accurate.

In all cases it is advisable to enter the quality of the lumber stored. This does not take much time as it is only necessary to add another column to the entries made above.

The last question is whether to use books for the lumber stock book or whether to use the card index system. The card index system is to be preferred if the workman in charge of the stock knows how to handle this system. In this case different color cards are used for the various kinds of lumber. Such cards that are completed, that is, where all the lumber has

been used, can be put aside and then will not uselessly make the index unwieldy. Cards can also be arranged much easier with reference to the numbers of the logs or the boards.

Many lumber yards and woodworking plant proprietors wonder why their stock-keeping systems do not seem to work in spite of all precautions. The fault is usually that several persons handle the book or else have access to the entries and to the yards instead of the task being in care of just one man. If there is more than one man handling the delivery of stock there is much chance for neglect, for forgetting entries, or of making false entries, and the result is failure in the system.

One workman who has been trained for that purpose and is well acquainted with the handling of lumber should have the task of measuring and marking all logs, lumber, boards, etc., and should be responsible for all stock coming out and going in. If such a man is well trained and is conscientious there is no reason why the system outlined above will not work to full satisfaction.

The Perpetual Stock Inventory

THE perpetual stock inventory, sometimes called the running inventory, is coming more and more into popular use in factories throughly alive to the value of up-to-date methods. This inventory, or record, is kept by making daily entries of goods received and delivered, on cards or loose-leaf sheets, one card being used for each completed article, or each part kept in stock.

The present-day business man wants a systematic stock record. He realizes that the lack of such a record has affected the prosperity of many a business. In any case it means handicaps and losses. With no record, or an incomplete one, it is impossible to tell how much of any kind of stock there is on hand without actual counting. It is also impossible to tell how fast any particular line is moving without considerable extra work on the part of the clerical force. In many cases it is only a guess whether certain parts are moving satisfactorily. One kind of stock or another is continually running out, entailing lost sales, expensive and annoying delays, disgruntled customers, and increased cost of manufacture. Stock receipts and disbursements are left to balance themselves. Stock receipts and disbursements are left to balance themselves, and the company is without protection against waste, or theft, or careless mislaying of stock.

The well-kept perpetual stock inventory will continually show all the important facts of the stock room. It will show at a glance the exact balance on hand of each kind of stock at any time. It will show the exact amount of each kind of stock used in any given time. It will give the facts which will enable the buyer to purchase at exactly the right time and to the best advantage. It will show which lines of stock are moving satisfactorily and which are not. It will enable the manufacturer to cut out promptly a single pattern or whole line that it does not pay to carry. It will provide an automatic check on letting stock run too low or on overstocking. It will show how and when every item in stock is used, and prevent mislaid stock and fix responsibility. In case of fire, insurance underwriters will accept such record as a basis for settling loss claims.

In keeping this record, if the card system is used, the cards will be kept in a tray, ordinarily arranged in alphabetical order by name of article and by sizes under each article. If the manufacturer has a complete catalog or pattern classification, arrangement by pattern number and by sizes under each number will be found the most practical method. A similar arrangement can easily be made by use of the loose-leaf system. The writer prefers the card record because of the ease with which new cards may be inserted in their proper places or old cards of dropped patterns taken out. With a person interested in the work, the card system will be found to give correct results and to be the easier to operate.

The best time to put a stock record into operation is at the period of taking inventory. At that time cards may be written up for each article or part, and after the initial work is done entries may be recorded daily with no difficulty.

While not essential, it will often facilitate matters to have cards of two or more colors. For example, blue for purchased material, buff for various finished parts kept in stock, and white for the completed article. The cards should be of one size, and it has been the experience of the writer to find 5 by 8 the most common size in use.

Article________ Location________ Unit________ Maximum Minimum

ORDERS PLACED				RECEIVED					ISSUED					BALANCE
Date	Reg. No	From	Quantity	Date	Reg. No.	Quantity	Rate	Amount	Date	Order No.	Quantity	Rate	Amount	Quantity

Fig. 1—Record of Purchased Materials

Fig. 1 shows a form particularly adapted to showing the record of purchased material. Hardware, such as drawer pulls, casters, screws, etc., and other purchased material will be entered on these cards as it is received, and checked off as it is used. It will be observed that this form also covers the purchase record, as it not only shows the material on hand, but also the sources from which it was obtained and the amount paid. So from this record the purchasing

agent will be able to tell the best place to purchase such material. It is possible to make notation of other quantities on this card, whether or not purchases are made. Fig. 2 is adapted to the record of finished parts, and, with a few changes, to completely assembled articles.

Simplicity should be the keynote in keeping the stock record. Shipping orders for merchandise stock will go to the recording clerk, who will make a debit posting on his card, and forward the orders to the shipping clerk. To show the shipping clerk that entries have been made on the record, it is advisable to check each item on the shipping order and place the initial of the recording clerk at some understood place on the order, usually the lower left-hand corner. In case goods are oversold, the recording clerk can also concerning the history of purchases and sales.

Actual count of certain articles in stock taken occasionally and compared with the card record will show whether the various clerks are doing their work faithfully, and will often prove that it is unnecessary to take an actual physical inventory at stock-taking time, for the information is always at hand and may be taken from the cards.

When one considers that such a record is kept by the United States Steel Corporation, with its diversified raw materials and finished products, the argument that such a record is impractical in operation falls flat.

The forms shown in this article are from actual working forms used in a corporation manufacturing flat and roll-top desks, office cabinets and chairs. In

Part ______ Size ____ x ____ x ____ Wood ______ Ply ______ Unit ______ — When stock is below

Symbol ______ Drawing ______ Room ______ Section ______ Bin ______ — Order.

For ______ Grade. Remarks ______

Date	Quantity Ordered	Order No.	Quantity Received	RESERVED		Quantity Delivered	Quantity in Stock	Price	Value Delivered		Value in Stock	
				For Order	Quantity							

Fig 2.—Record of Finished Parts

make a notation of the order number and the date when they may be expected to arrive in stock.

When any article approaches the fixed minimum, the clerk can make a written requisition on the purchasing or manufacturing department, taking care that the amount of his order will not bring the stock on hand above the fixed maximum.

These requisitions may be made in duplicate, the original going to the purchasing agent if the goods are to be purchased, or to the factory superintendent if the goods are to be manufactured, to serve as authority for the delivery of goods. The copy will be sent to the stock-keeper, that he may know that the goods are on order. On receipt of the goods the stock-keeper will make proper entries on his copy and return it to the record clerk, who will make the credit entries on the card.

Where it is desired to carry extensions of value in stock, invoices for purchased goods and costs of manufactured goods are sent to the record clerk before filing.

As regards factory material, the stock-keeper will give out material only on receipt of a "material order" signed by the foreman of the department requiring the goods. After delivery he will send the order to the record clerk, where postings will be made in the regular way. Then the orders will be sent to the cost department, where they will be used to obtain complete cost of material on orders in process.

In case the foreman over estimates the material needed for a given manufacturing order, he will return the excess material to the stock room, accompanied by a "material returned card," which is handled in the same way as the other slips.

From the foregoing it will be seen that the clerk of the perpetual-stock record holds an important position. He is in reality an assistant to the purchasing agent, an order clerk and a source of all information connection with the stock record argument, the purchasing agent recently informed the writer that he had more than $12,000 worth of hardware in stock, and that in comparing two actual complete physical inventories with the stock record there was a difference of less than $100 on each occasion; and in checking item for item in the January, 1912, inventory, it was found that seven errors were made in the actual count, and that the stock record was proved incorrect in but one instance.*

Shop Equipment

In fitting up a shop in a country place with small woodworking machines intended to be operated by power, the equipment may safely be regarded as consisting of a rip saw, a small scroll saw, a turning lathe, a small planer, either a top smoother or some light panel planer and a 3 or 4 horse-power gasoline engine. In some cases possibly a small rip saw and lathe with a light scroll saw might meet the requirements of the case. If there should be a regular planing mill within convenient distance the planer part might be omitted entirely, but generally where there is no planing mill conveniently at hand the country carpenter can save a great amount of hand planing by having either a top smoother or a panel planer. The lathe could hardly be omitted under any conditions, for there is a chance to utilize almost anything in the shape of waste in the turning lathe and scroll saw. Corner blocks can be turned out of scraps; also an almost endless variety of special decorative woodwork, to say nothing of the various wood novelties for household use that can be made during the dull winter season.

It is a short-sighted man that can't see the necessity of earning more than he is getting.

*By A. R. Maine, in the Woodworker.

The Evolution of a Good Cost System

How the Problem was Solved by a Large Planing Mill—A Method Beneficial to both Employer and Employee

IN this age of up-to-date business methods, almost every factory, shop and mill is at some time or other found devising some method of computing the actual cost of producing each item of its output. Possibly no two concerns have adopted the same method of obtaining this result and very likely several different methods have been tried by various companies, more especially those concerned in the manufacture of lumber, cabinet work and building material, therefore I shall try to explain a cost keeping system that is somewhat similar to one now in use in a large modern planing mill.

This planing mill's work consists almost entirely of large public buildings—" sky-scrapers "—and occasionally a lot of fixtures. Practically every piece of material handled in this mill must be worked to detail. The perfecting of an accurate cost-keeping system required the co-operation of the heads of departments for several months. Several different systems were given a trial, but none was satisfactory until the present one was inaugurated.

Upon being awarded the contract for the mill work for a building, the number of the contract, together with the contract price, is registered in what we may call the contract book. This contract number is placed on each and every shop ticket that is made out for that job. Registered in the contract book opposite the contract number is also a sales number; this sales number is placed on each shop ticket made out for the original contract, but any extra mill work or any changes that may be ordered are given a new sales number. The original contract number is always used, whether the work is extra or otherwise. Each new sales number is registered in a sales book, together with the price agreed upon, and each shop ticket is registered in the shop order book. The bookkeeper makes his charges direct from the shop tickets (after, of course, checking them against the dray ticket), and can easily tell an extra item from an original by the different sales numbers, and, by checking off the shop numbers in the shop order book, can readily tell when he has the job complete.

Having the contract, and having it properly registered, we are now ready to bill the work into the mill. For illustration, we will call this contract No. 128, and sales No. 945. Note the arrangement of the shop ticket—fig. 1, arranged with the idea of getting at the actual cost of production; not only the cost of labor is to be considered, but lumber, brass, hardware, etc., must be accounted for.

The shop ticket is divided into three separate spaces; First, the mill order, then the cutting bill, and third, the cost memorandum. By using carbon paper three copies of the shop ticket are made (usually on different colored paper), one for the shipping department, one for the office, and one for the mill. The back of the office copy is ruled for posting the time at the end of each day's work—see fig. 2. Each workman is supplied with a pad of time-cards, like fig. 3, which he fills out as he proceeds with the day's work. The mill order division of the shop ticket is made in the office; the cutting bill usually by the foreman of the department to which it belongs, but sometimes even the cutting bill is made out in the office. The cost memorandum is filled in after the work has been completed and the shop ticket has been returned to the office.

As soon as the shop ticket is received back at the office, the office copy, upon the back of which the time

Contract No. 128 Date Nov 6/09

Sales No. 945 Made by M. R. S.

Ship to Johnson Building Co. (Brown Res)

At 15th St and Grand Ave. City

When Dec 2/09

Shop No. 3840

	MILL ORDER		CUTTING BILL								COST MEMORANDUM		
	Pieces	Description	Pieces	Description	Thickness	Width	Length	Wood	Design		Ft. B. M.	Rate	Cost
	2	Plank Wd Frs. 24x36x1¾-1lt 13" Wall	4	Jambs	1¾	10½	3-7	Cyp			32	$45.00	1.44
		Clear Cypress—Detail *36	2	Heads	"	"	3-0	"	"		12	"	.54
			2	Sills	2¼	"	3-0	"			15	"	.68
			4	Hang Stiles	1¾	1¾	3-9	"			5⅓	"	.23
			2	" "	"	"	2-8	"	"		2	"	.09
	3	In. Dr. Frs. 2-10×6-10×1¾-No T. 5¾ J.	6	Jambs	1⅜	5¾	7-2	Y. Pine			36	25.00	.90
		Y. Pine—Detail *22	3	Heads	"	"	2-10	"	"		6¾	"	.17
													$4.05

FIG. 1.—SHOP TICKET.

Shop No. 3840

Date	Workman's No.	Mach.	Bench	Help	Cost	Date	Workman's No.	Mach.	Bench	Help	Cost	Date	Workman's No.	Mach.	Bench	Help	Cost
11/7	12	2:15			.90												
11/7	8	1:30			.45												
11/7	24			1:00	.20												
11/8	18		2:45		1.10												
11/9	18		1:30		.45												
					$3.10												

Cost of Lumber,	$4.05
Cost of Labor.	3.10
Cost of Merchandise,	
Running Expenses,	.80
Total Cost,	7.95
Selling Price,	9.25
Profit,	1.30

FIG. 2.—REVERSE SIDE OF OFFICE COPY OF SHOP TICKET.

has been posted from day to day, is pinned to it. Then we have the entire cost, all itemized, where it is readily seen how much the lumber, bench work and machine work, etc., have cost. After the job is completed the tickets are filed away in a suitable file, for future reference. Sometimes cost of a certain lot of unnecessary expense, if any. Running expenses are figured at a certain per cent. of the entire labor cost, as shown by the daily time cards, and very likely will vary at different times during the year.

This system, of course, will require an extra clerk in the office, but this extra expense is more than balanced by the extra saving of time in the mill. There are a few workmen in every shop, mill or factory who will invariably waste some of the employer's time when the foreman's back is turned. This is reduced to a minimum when such a man knows that the entire day's time must be accounted for on his time card. Of course, the better the workman does his work and the more he does of it, the more the boss thinks of him, consequently this system is a benefit not only to the employer, but to the employee as well.

DAILY TIME CARD.

Deliver to Foreman at end of each day's work.

Date 11/8/09

Workman's No. 18

Name J. Henry

Occupation Bench

Shop No.	From		To		Kind of Work
3644	7	00	7	30	Sash
2978	7	30	11	30	Doors
3840	11	30	12	00	Frames
3840	1	00	3	15	"
2980	3	15	5	00	Fixtures

FIG. 3.—TIME CARD.

Elm Leads in Canadian Cooperage

Although elm still leads among the woods used for slack cooperage, spruce is rapidly supplanting it. In the total output of barrels in the Dominion last year, there were used, according to figures compiled by the forestry branch of the Department of the Interior, 80,016,000 pieces of elm, in staves, headings and hoops, as against 37,704,000 pieces of spruce. There were, however, over 11,000,000 more spruce staves and 9,000,000 fewer elm staves reported for 1911 than for 1910. In time elm will probably be used only for hoops, as it is the best wood for the purpose, the supply is fast diminishing, and other species can be used to advantage for staves and headings. The ultimate substitute for elm will probably be birch, which is comparatively plentiful.

Slack cooperage is of vastly greater importance than tight cooperage in Canada. This is because the majority of Canadian products are of a rough and dry nature, such as lime, potatoes, apples, dry fish, flour, cereals, etc., and because Canadian woods are best suited to slack cooperage.

White oak, the only wood which can be used for containers of alcoholic liquids, has been practically exhausted in Canadian woodlands. In 1911 only 2,768,000 oak staves were cut, while 7,293,000 were imported.

A rough estimate on the part of the forestry branch places the minimum amount of material used in the manufacture of all classes of cooperage as 62,353,190 board feet, made up as follows: staves, 29,367,714 feet, heading, 24,466,666 feet, and hoops, 62,353,190 feet.

Changes in the Saw Manufacturing World

Henry Disston & Sons, Philadelphia, Pa., the well-known manufacturers of saws, have made a change in the management of their branch office and factory at Toronto, Ont., by appointing Mr. Samuel Y. Dingee to the position of manager of this important branch. Mr. Dingee has been in the employ of the company for 32 years, having entered in October, 1880, at the age of 15. Since that time he has gradually advanced into more important and responsible positions. Mr. Dingee's business education has been all in the line of mill saws, used in the manufacture of lumber, such as band and circular saws and machine knives and tools. He has had exceptional opportunities for acquainting himself with the details of the manufacturing end of the business. Mr. Dingee has also had a wide experience in the use of saws, and is therefore well qualified for his present position, not only on account of his practical experience, but also because of his training at the works of Henry Disston & Sons at Philadelphia.

Samuel Y. Dingee
Toronto Manager, Henry Disston & Sons

New Saw Manufactory for Toronto

The Radcliff Saw Manufacturing Company, Limited, which has recently been incorporated, has its head office and factory at 550 Dundas street, Toronto. Mr. W. E. Radcliff is the president and general manager of the company, and with him are associated Mr. J. Kennedy Hill, as sales manager, and Mr. R. E. Martion, who is in charge of production. These three gentlemen are well known in the saw business.

Mr. Radcliff, previous to joining the above company, had just completed twenty-three years' service with Henry Disston & Sons, the last eight years as manager of their Canadian business.

Mr. Hill has had a wide experience in the saw mill trade, having been actively identified with this industry in the Province of Quebec. For the last six years he has represented the Disston Company in Eastern Canada.

Mr. Martin may be said to have spent his life in the saw mill business, having had no less than thirty-five years' experience. He has been a superintendent in the Disston factories for the past twenty-five years.

Skilled workmen in their particular lines have been chosen as employees of the new company, and starting under such favorable conditions, the Radcliff Saw Manufacturing Company, Limited, should be assured of their fair share of the Canadian trade.

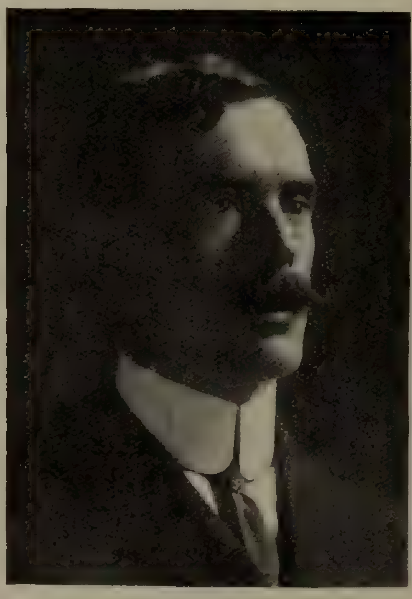
New Saw-Making Company Incorporated

A new company which will do business under the name of the National Saw Company, Limited, has been incorporated at Ottawa with a capital of $500,000, to manufacture and deal in all kinds of saws, etc., and to take over as a going concern, the A. J. Burton Saw Company, of Vancouver and Ottawa. Hon. N. A. Belcourt and some of the leading manufacturers and business men of Ottawa are interested in this concern.

Addition to Plant of Simonds Saw Company

The saw and machine knife department of the St. Lawrence Saw and Steel Works Company, Limited, at Sorel, P.Q., has been purchased by the Simonds Canada Saw Company, Limited, 95 Rue St. Remi,

W. E. Radcliff, President



J. Kennedy Hill, Sales Manager

R. E. Martin, in charge of production

OFFICIALS OF THE RADCLIFF SAW MANUFACTURING COMPANY

Montreal, P.Q. The St. Lawrence Saw and Steel Works Company, Limited, have established for themselves an unsurpassed reputation for the production of excellent saws and knives. The Simonds Saw Company have also an excellent name as producers of similar articles and in taking over the saw and machine knife department of the St. Lawrence Company they are adding greatly to their capacity and are securing a plant which will enable them to maintain and increase the splendid trade which they have worked up in all parts of Canada.

What Constitutes a Good Varnish.

A good varnish has good body, sufficient to give good luster, yet not too heavy to work badly and dry unevenly. It works smoothly under the brush and spreads in a thin, even coat, free from streakiness, still has sufficient consistency. It is elastic when dry and will not crack. It is durable and for outside work particularly indifferent to the effects of moisture and atmospheric conditions. It adheres tenaciously to the material to which it is applied. It is of good color that will not darken on exposure. A good varnish is good only for its particular purpose, as a varnish " long in oil " is intended for exterior work, floors, etc., while a varnish " short in oil " is intended for inside trim work. The safest method is to use the varnish which a reliable manufacturer recommends for a given purpose, for that purpose.

How may varnish be tested? Varnish may be tested for paleness by placing a small quantity of it in a thin glass vial, and comparing it with any standard sample, by holding both samples to the light.

Varnish may be tested for wear by applying two coats to two pieces of well dried, carefully sandpapered, newly planed wood, says a recent issue of Pratt & Lambert's Varnish Talks. One piece of wood should be coated with the standard sample—the other piece with the varnish to be tested. Place both pieces of wood in an exposed exterior situation and not from time to time the appearance of the work. The piece which loses its brilliance and cracks in the shortest time has been coated with the inferior varnish. Of course by this test you must compare two varnishes intended for the same purpose, such as two interior varnishes, etc., and not two entirely different varnishes as an exterior varnish and an interior varnish.

Another simple test is to revarnish any suitable surface with the suspected sample, and when the varnish is thoroughly dry, rub it quickly with the finger. If the new varnish crumbles up quickly, it evidently contains an inferior gum or most probably a large proportion of rosin. A good copal varnish cannot be removed in this way. A method of testing varnish for elasticity is to apply two coats of it to a sheet of linen and after it has properly dried, try its flexibility or tendency to chip off by crumbling between the hands.

Painting New Woodwork

In painting new woodwork a consideration of the character and condition of the surface is the most important factor. The kind of wood used in the building should be carefully studied, and it should be determined whether hard open-grain or hard close-grain; soft close-grain or very soft open-grain; soft and spongy; compact or solid, and also whether it is kiln or air-dried timber. If it is kiln-dried, and the drying process has been carried on too rapidly, the wood may have become case-hardened, leaving it brittle and lifeless. The timber having thus lost part of its vitality or physical strength, the paint must be mixed to a consistency which will penetrate to a depth that will insure satisfactory results. If the paint is of a heavy consistency, and lies on the surface, the fibers of the wood will break away through contraction and expansion, bringing the paint with it. This trouble is always laid to the paint, while the real cause is that the primary coat was not properly reduced to penetrate a sufficient depth to insure the proper binding.

Wood that has been air-seasoned has had little or no opportunity to lose any of its strength or vitality, and it will hold paint well.

While it is not practicable to have separate mixes of paint for the various characters of timber in the same building, it is practicable and necessary to examine the work to be painted and note its characteristics as to absorption and drying qualities; also the condition of the timber—whether old, discolored, and partly decayed from lying in the log too long before being cut or in some damp place after it had been cut up.

It is impossible to do satisfactory two-coat work on certain kinds of wood. A priming coat mixed heavy enough to assist in hiding the dark spots or grain will not contain sufficient oil or thinners to fully satisfy the wood, and the wood will soon rob the paint of its oil or binder. The priming coat being applied heavy will not allow sufficient penetration of the second coat to assist in supplying the wood with sufficient oil to hold the paint to the surface, thus resulting in the paint breaking loose in scales, elastic on the outside and lifeless on the side next the wood.

Knotty Points

To Fit the Crime

"What is the extreme penalty for bigamy?"
"Two mothers-in-law.

Nearing the Roof

"I started to work on my twentieth story yesterday," said a busy looking man, "and I tell you I'm making it pay."

"You are an author?" suggests his neighbor.

"Certainly not! I'm an architect."

Under the Union Rate

While an Irishman was gazing in the window of a Toronto book store, the following sign caught his eye: "Dickens' Works All This Week for Only $4."

"The divvle he does!" exclaimed Pat in disgust. "The dirty scab!"

Cereal Soap

"How do you like the new oatmeal soap?" inquired the barber, wielding the lather brush with extraordinary freedom.

"Seems nourishing," the customer replied, "but I've had my breakfast."

Privileged to Challenge

Judge.—"You are privileged to challenge any member of the jury now being impaneled."

"Well, then, yer honor, O'll foight the shmall man wid wan eye, in the corner, there ferninst yez."

Signs to be Noted in Identifying Wood

There are three groups of characters considered in the description and identification of woods; factitious or made characters, essential characters, and natural characters.

Factitious characters are those which are taken as marks of distinction. For instance, certain circumstances with respect to averaged results of tests on wood are sometimes fixed upon for distinguishing groups, as exemplified in the terms hardwoods, which are generally accepted to mean those from broad-leaf trees, such as oak, ash and elm, and softwoods, a name applied to the wood of cone-bearing trees, such as pine, fir and cedar, which are usually softer.

Although nature has formed the conditions upon which these facts depend, the arrangement of woods is an invention of man, and therefore is too artificial a device to be wholly scientific. Since the terms hardwoods and heterogeneous (porous) woods are practically synonymous, and so also softwoods and homogeneous (non-porous) woods, one arrives at the first two chief groups into which woods are divided.

Essential Characters of Groups

Having determined characteristics which led to these groups, one is prepared to determine smaller groups. The next step is to find more restricted characters termed essential characters, which are features such as may be seen, for instance, in transverse sections.

Certain woods of the heterogeneous group have their pores distributed equally throughout the annual rings of growth, while in others the large pores are more numerous in the inner portion of these rings. These two subdivisions are called diffuse-porous and ring-porous, respectively. Under this head may be classed all the forms of character peculiar to a genus, and such that distinguish one genus from all other genera.

The marks which distinguish one genus from another in a family are always such as do not belong to the whole group, for the genera are always distinguished by characters which do not belong to the whole family. It is more difficult to find characters that are constant for separating species, but the specific characters are less important than the generic. The latter are more valuable, trustworthy, and much more apparent than those of the species.

Families are grouped together by marks of resemblance found in genera. Species are often distinguished by their factitious and natural characters. The latter constitute the third and last group.

Natural characters are more difficult to define, though understood by all. They consist of the general appearance of the wood, including odor and general impression gained through the senses of touch and taste.

Method of Grouping Woods

By means of these characters all persons are enabled to make some kind of an arrangement or classification in their own minds, although they might find it difficult to explain their reason for this classification to others.

It will appear from this explanation of natural characters that in some respects this method of grouping woods depends upon characters which can only be learned and understood through long observation and study.

For instance, there are species of certain genera that have woods so nearly alike in structural character that the microscope will reveal no constant differences whatsoever, and they can be recognized only by their natural characters, knowledge of which enables the timber merchant to distinguish long-leaf pine from short-leaf or loblolly pine, or the many mahoganies on the market to-day from the true kind. This is a method that is wholly unscientific, and can not be employed with woods with which the expert is unfamiliar.

The following rules are usually observed by those who wish to identify a piece of wood by the scientific method:

All classification proceeds from a careful microscopical examination of all its elements and their comparison with those of known woods.

Every structural distinction which establishes between individuals any resemblance or any difference, is a character; that is, a sign by which they may be known and distinguished.

The presence of certain wood elements, their different modifications and position with regard to other elements, are so many characters.

The presence of elements and tissues furnishes positive characters, and their absence negative characters.

Comparisons for Groupings or Separations

Positive characters offer means of comparison and show resemblances and differences which exist between individuals; woods with characters that differ only slightly should be grouped together, while those with widely different characters should be separated.

Negative characters, as they allow no comparison, can only be employed to separate individuals, and not to class them together.

Broad and narrow pith rays, a pentagonal pith, wood-parenchyma fibers in tangential lines, numerous calcium oxalate crystals present, and considerable tannin in the pith rays and bark, are characters that are positive, since they are founded on something real, and the wood having such characters may be classed under one group—the oaks.

When we say that the wood is destitute of pores, bands of wood-parenchyma fibers, and crystals of calcium oxalate, it is not possible to establish any real basis for a comparison. If it is desired to separate woods without pores from those with pores this single character establishes at once the difference which exists between the two groups of woods and the resemblance which exists between individuals of each group.

Thus, positive characters possess great advantage over negative ones, and the latter must not be used when the former can be employed. Positive characters can only be founded upon evident facts, and never upon a presumption of the existence of facts derived from analogy.

Constant or Inconstant Characters

Positive characters are constant or inconstant. Trees grown under exactly similar conditions of soil and climate produce wood with similar characters, and the kind of elements are always the same. Trees grown under widely different climatic conditions yield

wood with elements that vary in size, shape and general appearance, and the gross structure of the wood therefore varies proportionately. The wood of two oak trees, one growing in rich moist soil with abundant growing space develops wide annual rings of growth with a large proportion of late wood; the one growing under adverse conditions has very narrow rings and a small proportion of late wood.

Such differences must be taken into consideration in classifying woods, and it requires long observation and wide knowledge of the variation in woods produced under different external conditions. The size of the wood elements, the color, hardness, odor, and durability of wood must be regarded as inconstant characters.

The classification of woods must always be based upon constant characters, which are either isolated or co-existent. Wood fibers of true mahogany are septate (partitioned or fenced off, from sepium, a fence), a character that is isolated, for it is not connected with any other characteristic trait. The tracheids (tapered cells) in oak adhere chiefly to vessels and form between them bordered pits. The character of adherence of these two elements for forming the bordered pits is a coexistent character. It is always desirable to use the most prominent characters visible to the unaided eye.

The employment of characters which the layman can use is said to be the "rule-of-thumb" method. Experience teaches us, however, that there are a great many woods which can not be recognized by such superficial characters alone. For instance, the wood of Columbian mahogany so closely resembles true mahogany that even the expert can not always tell them apart without the aid of pocket magnifier. The necessity of resorting to the microscope in order to establish the natural relation of woods cannot be overestimated.

Modern Methods of Finish on Oak

By the above I do not mean, says a writer in an exchange, the finish where a stain and coater are combined to do away with the use of a stain and filler, as I have seen numbers of times on suites, etc. While this may result in a cheap finish, as far as cost is concerned to the manufacturer, it is looked upon as cheap by the merchants and invariably injures the manufacturer. That class of finish retains its gloss and color about long enough to get out of the factory and in the merchant's store. We must not lose sight of the fact that it is the finish, after all, which sells goods, and its lasting qualities bring duplicate orders. To economize in the finishing room is penny wise and pound foolish.

In finishing goods of quality, the first thing to be done is to see that the work is dusted off and cleaned thoroughly, either before leaving the cabinet room or in the finishing room, before applying the stain. The former is the proper place to do this, as it keeps much dust away from the finishing room. In finishing quartered-oak suites, golden oak finish, the quartered parts should be stained with a little stronger stain than for plain oak, in order to have uniform color. In other words, where the fronts or panels are of quartered oak, and the less exposed parts plain oak, one should have two pots of stain, one for plain oak and one for quartered parts; also a brush for each one, as will save time and going over the article again.

Care must be taken so as not to get any stain on end work or carvings, as will cause it to become too dark. Either use a very weak stain for this or leave it for the filler to color. The latter, I find, is the best, as it does away with staining or shellacing those parts. This stain should be left for about one hour before filling, then fill with a transparent filler of 17 lbs. to the gallon—that is, 17 lbs. of filler to 1 gal. of turpentine and benzine. Do not make filler by guesswork, but weigh and measure it carefully. Apply this filler over the stain and allow it to dry until it becomes flat—that is, until the turpentine and benzine have dried out, which usually takes about fifteen minutes—then take a piece of sea moss, burlap or cotton waste and rub across the grain until all the surplus filler has been removed.

Next get a piece of soft cloth (cheesecloth preferred) and rub with the grain until clean or polished. For the corners or carvings use a lead pencil pick, which should be sharpened on one end like a lead pencil, with the other end flat; this enables one to clean thoroughly. Then set away to dry for forty-eight hours, after which tone up any light places or dark spots. After this is done, give a general sanding with some worn-out sandpaper, and dust off, then give a coat of shellac made of equal parts white and orange. This should be allowed to dry for ten or twelve hours, then sand with No. 0 garnet paper. When the nail holes have been puttied up, after dusting it is ready for the first coat of varnish. This should not be applied too heavy; just a medium coat. After this has been allowed to dry for forty-eight hours or so, it should either be sandpapered or rubbed with steel wool. After dusting off and the carvings and corners cleaned with a small hand bellows, it is ready for the finishing coat.

It is taken for granted that this work is being done in a room well lighted and ventilated and with an even temperature, say about 70 deg. F. Any variation in temperature will cause the work to crawl, chill, or some of the numerous other defects which are hard to find, and for which many times the varnishers or coaters are blamed. By having a thermometer and a self-recording thermometer clock in the room one can readily see if the proper heat is maintained during any hour of the night or day, without relying on the watchman to keep up the heat. He may think he has kept the proper amount of heat, but as his duties are many, while on his rounds in the shop the fire may have gotten low.

This last coat should be left to dry at least seventy-four hours, then rubbed with fine pumicestone, using a felt pad for this. After washing off with clean water, dry with a chamois skin and let dry for ten or twelve hours, then polish with a good polish and rotten stone. As to the polish used, each foreman finisher has his own pet polish and many of them are very good, so I leave this to the finisher.

The time given here for drying between coats is not by the patent drykiln process. This process will reduce the time considerably and not in any way injure the finish. On the contrary, rather it will help it, as it eliminates dust and dirt adhering to the work from standing while drying.

Efficiency in the Pattern Shop

Some specific examples of motion study and general observations on the problem of efficient shop operations were contributed recently to the Philadelphia Foundry Foremen's Association by James Whitehead, president of the association. They related chiefly to the pattern shop, and one case mentioned had to do with making foundry flasks.

The flasks are dovetailed, and it was the custom in getting out the lumber for the flasks to allow ⅝ in. to project through the sides after being put together, then to trim them flush on the band saw. At one time Mr. Whitehead had an order for about 250 flasks. He figured that each flask had eight times ⅝ in. to be cut away, and multiplying this by 250 he found that he was about to lose 104 feet of lumber on the one order alone. Besides, they had to make eight cuts on the band saw to each flask, which consumed about 3 min. per flask; this, multiplied by 250, amounts to 12½ hrs. steady work, not to mention extra sharpening of saws and probably breakage. A conservative estimate was a loss of about 5 per cent. of time and 100 feet of lumber on the job. When he pointed this out to the men they tried to tell him that this was the best way to do the job and had been the practice. He turned to the most intelligent of the men and talked it over with him, told him to work from the outside to size and follow his directions precisely nd that he would assume responsibility for their correctness. The result was successful, but since then the men were found falling back to their old ways. They were then told that if this was repeated their places would be filled with men who would follow instructions.

Another instance was this: One of Mr. Whitehead's pattern makers was making a pattern which was curved in two directions. Having cut one curve on the band saw he proceeded to cut the other way with his bench tools, because it had always been done that way. He was shown that by saving the block from his first cut and tacking in temporarily in its original position he could turn the piece on end and cut the other curve and save a great deal of time. Several times Mr. Whitehead has had to break up old-fashioned methods of doing work by pointing out new and better ways, and this is no easy task where men have been long employed in one place.

While acting as assistant foreman in a large jobbing foundry the author was called in the absence of the foreman to estimate on an outside job, and when the order was taken the foreman said it could not be done in the time Mr. Whitehead had estimated by the fastest men in the shop. He had to show what could be done by going on the bench himself. The job consisted in wood bench work and wood turning, brass molding and then brass lathe work and finally bench work and gating, and with the eyes of 40 men on him he managed to do the job on time, doing everything but the molding. Had he not been able to make good he would have lost, he said, his hold on the men.

While working as a carpenter, Luke Parsons, of Pittsfield, Mass., formed the habit of swallowing nails. He complained at a hospital of trouble with his digestion, and an operation revealed 132 nails of various sizes, two keys, a buttonhook, and a piece of iron in his stomach. After the removal of the collection his condition was described as "comfortable." He should certainly have felt relieved.

Tests for the Quality of Glue

As glue made from Hyde trimmings ,etc., contains the most glutin, which is the cementing principle of the glue, the handy man must be able to distinguish the Hyde glue from other varieties, if he would avoid the occasional failure of his joints. While the nature of glue makes it rather a question of mechanical tests as to the quality of a given sample, than of laboratory tests, yet there are laboratory tests which serve to determine the sourse and quality of the sample.

A weighed sample is laid for twenty-four hours in cold water (not over 60 deg. Fahr.), and at the expiration of that time the excess of water is poured off and the jelly is weighed, the weight taken is deducted from this amount, the remainder is divided by the weight taken, and the result is absorption. The amount of water which the sample will take up and the character of the jelly found, not only serve to indicate the source, but also the quality of the sample. Hyde glue takes up less water than other glue or gelatine and forms a very soft jelly which is rather difficult to weigh accurately.

As Hyde glue that has been twice dissolved and again dried is capable of drying out more thoroughly and of showing better water-assimilating properties on redissolving, than glue obtained by a single drying, the relative amount of moisture already In the sample should be estimated. This moisture is best estimated by subjecting a gramme of the coarsely granulated sample on a weighed watch glass to a temperature of 220 deg. Fahr. for one hour, weighing again, and computing the loss. Since the size of the granules makes considerable difference, care must be used always to have the granules of different samples about the same size.

The quantity of ash, like the color, fracture and transparency, may vary within wide limits, without affecting the quality of the glue, but the percentage of ash is given in the following results of some experiments by the writer, to show about what should be expected.

Water absorption	Appearance of Jelly	Moisture per cent.	Ash per cent.	Remarks
11.56	firm	8.70	2.36	Bone glue
9.07	firm	8.31	1.98	Hyde, twice dried
4.93*	nearly fluid	7.76	1.13	Hyde, once dried
4.79*	nearly fluid	14.50	1.06	Hyde, once dried
8.57	very firm	6.59		Hyde, twice dried
6.94*	nearly firm	45.00	2.37	Hyde (?)
5.98	nearly fluid	16.00	2.38	Hyde
15.57	ext'l'y firm	33.00	1.00	French gelatin

The samples having the water absorption figure starred, gave the greatest satisfaction in use, because they set very rapidly, and did not so completely dry out when exposed to a dry atmosphere that the furniture, etc., on which they were used, fell to pieces.—Scientific American.

Utilizing a Product Hitherto Wasted

An application has been made to the city of Vancouver by ten prominent saw-mill owners for a franchise to sell steam heat, and electric light and power generated by burning saw-mill refuse. The application came immediately after the report of a committee

of the City Council dealing with the smoke and sawdust nuisance due to burning mill refuse in the city.

It is proposed to install plants for burning the refuse at each of the various mills, thus permitting a wide zone of distribution and enabling steam heat to be furnished at much lower pressure than from one central plant. The intention is to establish an auxiliary oil-burning apparatus at each mill for use in case of accident to the main plant and also whenever the supply of refuse runs low.

The problem of disposing of refuse without a loss has confronted mill owners for years and with coal selling at $7.50 a ton retail in Vancouver, it is thought that this scheme for utilizing it will prove successful. It is estimated that these mills have 114,000 cords of refuse and sawdust to burn each year. The approximate cost of installing each burner is placed at $30,000, and the annual operating cost at $5,000.

Why One Planerman Changed His Vocation

John Brown was a man of unusual qualifications when it came to handling a planer and besides had a fair knowledge of business methods both in and out of the office. John became dissatisfied with his lot one day and decided to get a more remunerative position. He answered several advertisements and the correspondence that passed between them is mighty interesting. Particularly so in the case which follows:

Dear Sir:—

We have your favor of the 13th inst., with recommendation, and in reply beg to inquire if you can operate a fast-feed matcher?

Please state what speed you have acquired in feeding and grading lumber.

In regard to salary will say we have always paid $30 to $40 per month, according to ability, but this is a very fair salary compared with the very reasonable living expense at this place.

A single man can live on $15; a married man without or with a small family could live on $30.

You will readily see therefore, that this is a very desirable place for a man who is anxious to save money.

Below we give you a memorandum of duties we would expect our planerman to perform and trust you will kindly write us at once giving your age and the above information, when we will be pleased to further consider your application with others now before us.

Yours truly.

Memorandum of duties to be performed by planerman:

Operate the matcher, grade the lumber as it comes to the mill, grind all tools, keeping all machines in good running order and well oiled, make all repairs on the various machines in the mill, installing a shop cost system, hitching pony to cart and driving to town twice daily with the mail, sweeping and adjusting office every morning.

Here is Mr. Brown's reply:

Gentlemen:—

Yours of the 1st inst. to hand. In answer to your questions will state that I am a first-class mechanical expert and operator, being able to handle and grade lumber at 250 lineal feet per minute.

Not having given you full information as to my capabilities I beg to put them before you now.

I am 42 years only. Have had 23 years active business experience, being connected with one of the world's largest planing mills in the capacity of General Superintendent, and feel confident that if you will give me a trial I can prove my worth to you. I am not only an expert mechanic, proficient planerman, excellent horseman, etc., but have several other accomplishments that may make me desirable.

The light duties which you enumerate in the capacity of planerman, mechanical expert, cost accountant, stable boy, etc., would not, I am afraid, keep me busy, and would not be enough to keep me from getting lonesome. I am an expert snow shoveller, a first-class peanut roaster, have some knowledge of removing superfluous hair and have a medal for singing in the church choir. Am a skillful chiropodist and a practical farmer, can cook, take care of horses, crease trousers, open oysters, repair umbrellas, cane chairs, and am also the champion plug tobacco chewer of Pennsylvania. My spitting record is 38½ feet. Being possessed of great physical beauty, I would not only be useful but ornamental as well, lending to the sacred precincts of your mill that delightful charm that a vase or stuffed billy goat would.

My whiskers being extensive and luxurious, my face would be useful as a pen-wiper and a feather duster.

After work I can take care of the children and having use of the pony cart could act as a public dog catcher on my way to and from the post-office.

As to salary, I feel that I would be robbing the widows and orphans if I were to take advantage of your munificence by accepting the fabulous sum of $40 per month, when my expenses as a married man would be but $30 and would therefore be willing to give my services for $35, thereby giving you the opportunity of not only increasing your donation to the church, but also enable you to endow a free bed in the dog's home.

Really, gentlemen, your unheard of bounties border on the supernatural and to the unsophisticated must appear like reckless extravagance. By the way, I might ask if it would be objectionable if I should practice on the cornet in the mill during my leisure hours?

Hoping this will appeal to you, and that you will further consider my application, I am,

Yours truly, ————

—Berlin Quality.

Hanging Back

EVERY now and then a certain number of business men say, "Well, just wait until the end of the year and I will make some big changes around my plant." But when the end of the year comes a good many decide to let things jog along for another year. These are the men who hang back. They are not keeping abreast of the times.

So if you have been contemplating putting in some new machinery or making necessary repairs, don't hang back again this year. Start in and get in touch with the machinery salesman. Find out what you want and get it. And while you are at it make those repairs and alterations that you have so often contemplated. Don't hang back this year. It's the men who hang back that are the most discontented ones in any business. In any case the habit is an unprofitable one.

Honesty is at the bottom of craftsmanship the same as of salesmanship. It is also at the bottom of pretty nearly every other good business attribute.

First Factors in Furniture Factories

The Requisites of a Well-Organized Business Run on a Paying Basis — Up-to-Date Methods for Various Departments*

WE know very well that the main factors of industrial success in the furniture manufacturing business are, excellence in workmanship, economy in production, increased output, and a right appreciation of the practice of "scrapping," the whole dominated by a spirit of enterprise, tempered by experience and realized by means of an intelligent and well-thought-out organization. The initial step in securing this thoroughly efficient organization is to institute a complete, simple, yet efficient, cost system.

A thorough knowledge of cost in furniture factories would be the means of almost entirely stopping the habit of copying designs and making them from $1 to $3 less than some one else, on speculation. An efficient cost system will give the manufacturer an exact comparative value of his men, and he is able to intelligently determine who are his money-makers and who are not. It has been stated that a good cost system is better than a foreman, for it cannot "stand in" with men who scheme to kill time. In other words, cost-keeping has for its main object the determination of the efficiency of men; it leads to better management and dispenses with many sub-managers.

Unfortunately, the cost of running a cost department is a constant irritation to many manufacturers who have yet to realize that it costs to be safe. There is no doubt but that the cost of conducting a cost system is important; we must, however, apply the same common sense in this connection as we would in solving the problems of gaining efficiency in furniture factories. What manager would permit his cabinetmakers to rip boards with the old-time hand rip saw when a power-feed saw may be operated on the lower floor? Many so-called business experts are installing systems which are too complicated. A great many cards are used which are unnecessary. It is unquestionably true that a number of furniture manufacturers have been stung by certain people calling themselves systematizers, who endeavored to install systems, for a substantial consideration, which were a joke. There are a few good systematizers. Only the very best talent should be engaged.

Cost-Keeping.

The writer studied the subject of cost-keeping as thoroughly as any manufacturer; saw systems in operation in some of the very largest furniture plants, which paid enormous prices for this information. After spending much time in collecting information and comparing systems , I came to the conclusion that all the systems I had studied for our business which seems perfect in all that the name implies, giving all the information any one can possibly wish for; and we are not spending too much money in determining the cost of our goods, either. A good cost system will show whether goods are being furnished at a profit or at a loss; it will show the absolute cost of every order going through the plant.

The working capital must turn over often. Every manufacturer welcomes orders. Sometimes, however, more orders are booked than the working force can fill within the time specified. The office seems to disregard the superintendent's plans, and may, for instance, be instructed to push Jim Smith's order, which probably came in that very day, but Smith informed the office that unless he could have the goods within ten days do not book the order. To-morrow Smith's order may be partly machined, when along comes a good-sized order from Brown & Company for perhaps twenty different patterns of dressers. This is a telegraph order and must be delivered within a few days. The office becomes very much excited and instructs the superintendent to give this order preference over all others. The superintendent may have a hundred or more different styles started, but under such conditions is unable to complete any of the orders within the time specified.

Value of Co-operation

In most cases little, if any, consideration is given by the office to conditions existing in the manufacturing end of the business. The office force does not produce, hence what would this force accomplish were it not for the unabated energy, skill and intelligence of the superintendent, foremen and workmen themselves? The heads of real live and progressive furniture plants recognize this—and they are the plants that pay dividends. More than one good superintendent, foreman or workman has severed his connection with some furniture plant because an insolent, bone-headed office clerk made his job everything but a pleasant one. We must have complete harmony in our workshops. No enmity should exist between the office and manufacturing departments.

The writer has visited many of our most successful furniture factories, and certainly believes that most factories are carrying too large a line. This, I know, has been our experience. It is absolutely certain that 100 rockers can be manufactured at a much lower cost than can six or a dozen of the same pattern. The house may receive an order for a few rockers. The manager finds that pattern sold very well and decides to manufacture a few hundred. He may sell all of the rockers. Again, he may be compelled to sacrifice considerably more money on the large number than the loss in manufacturing the small number would be. Some manufacturers fix a certain amount which the sales of each pattern should reach, and if it fails to reach this total, they drop the pattern.

One great trouble with our plant is, we have too many designs. I am of the opinion that we manufacture more different styles of furniture frames than does any other concern in this country. Have taken this up with our manager a number of times. We are actually manufacturing patterns which were sold twenty years ago. Of course, many of our goods are manufactured in large quantities. As long as the pattern sells, my people continue to manufacture it, however; in the meantime new designs are added to the line.

The writer's experience has convinced him there is no money in special work. Some managers have a perfect mania for taking in work of that kind. They would manufacture a piano or barn door if they received such orders. The manufacturer having an established trade, which keeps his plant busy at all

times, has no business bothering with special work. He may make a few more dollars on a certain job than he would on his regular work; on the other hand, he may lose some of his very best customers—and, after all, our first duty is to our patrons. There are, of course, many concerns which make special work their regular business, but the average furniture manufacturing plant manufacturers its regular line of furniture. Then why load your men with details other than pertain to your regular line?

One of the greatest troubles in furniture factories is, part of a certain design will be machined to-day and delivered to the cabinet room. After a week the machine foreman will deliver another stock lot of the pattern, and so on. Stock is not permitted to drag in modern furniture factories. All the stock for a pattern, whether the quantity be for six or 600, must be delivered at the same time. The cabinet foreman checks the stock, and, if any part is missing, the entire lot is refused. This reported to the superintendent or manager, and the machine foreman usually makes it his business to complete the machined stock without much delay. After the stock reaches the cabinet room very little trouble is experienced. This, at least, has been our experience.

Scientific Management

Each department should be kept constantly in touch with the progress of all the work, so that any deviation from the original schedule may not be the cause of misunderstanding nor inconvenience to management or men. Most managers now fully appreciate that unless each man and each machine turns out more work than competitors in the same line of business, they cannot afford to pay higher wages to workmen and make money themselves. In order, however, to do this, scientific management must be introduced into factories. Rule-of-thumb methods cannot possibly compete with the methods used under such scientific management. Where such management has been introduced, enough money has been saved within a surprisingly short time to more than pay for the work of experimenting.

The basic principles of scientific management can be stated under four heads: (1) Determine accurately by scientific analysis the elements of each piece of work and decide how it can best be done; (2) select men who are fitted for the work—even for the lowest kinds—and train them in the way that has been determined to be the best way of doing that task; (3) by adequate supervision and a system of payment which gives the men an incentive, making sure the men practice the best methods all the time; (4) divide the work between the management and the men, so that the management does all the work which it can do better than the men.

The study of motion has also a definite place in the evolution of scientific management, not wholly appreciated by most furniture manufacturers. Its value in cost reduction cannot be overestimated. Through motion study alone, applied to unsystematized work, the output can be more than doubled, with no increase in cost.

In nearly all furniture factories cabinetmakers are compelled to furnish their own tools. It has been proved that this is poor business economy. Most workmen who are compelled to furnish their own tools usually buy only such tools as in their opinion are necessary, probably due to their having too much thrift, lack of money or fear of having them stolen. Again, where workmen furnish their own tools they may use them after they are too much worn to do good work. Apprentices should be taught their trades with the very best tools obtainable; those taught with poor tools often find it difficult to adapt themselves to the use of better new tools.

Value of Good Machinery.

Progressive furniture manufacturers must install the most modern wood-working machinery at all times. It is poor economy to operate the old-style hand-feed rip saw when the self-feed and automatic-return rip saves half the labor, increases the output and cuts the lumber much more accurately than can be done with the hand-feed saw. This accuracy eliminates the necessity of jointing each piece, also does away with the usual allowance for sizing.

The self-feed jointer attachment does more and better work than four men can do with hand-feed jointers, with a big saving over the old, dangerous way of doing the work. This is certainly an invention which has been welcomed by many manufacturers.

Modern manufacturers do not use the old-time surfacer, which surfaced only from 15 feet to 20 feet of stock per minute; instead, the surfacer machining from 50 feet to 100 feet per minute is now installed in our factories. Of course, this high speed could not be obtained were it not for the thin knives and the devices for setting, balancing, etc.

The new multiple-spindle, double-table, power-feed boring machine is also a great labor-saver. The new style belt sanders have revolutionized, simplified and perfected the art of sanding. These machines sand all irregular-shaped pieces with great rapidity and the work is beyond criticism. There are a number of good machines on the market which will save money rapidly as compared with the old-fashioned way of doing things. The manufacturer who has his moldings and irregular-shaped pieces sanded by hand no doubt is one of the men who has not been making any money the last three or four years. Improved machines do not always improve profits, but unless the furniture manufacturer keeps his plant equipped with the very latest machines he will be frozen out. The fact that your machines are machining your lumber is not all that is required. You must attain the highest rate of feed per minute, hence increase your output.

An improved wood-turning machine has now been placed on the market which is becoming quite popular. The old way of making round, square, octagon and hexagon parts was by the old method of hand-turning, or with a band saw, and shaped and band-sawed afterwards. This new machine eliminates all high-priced labor for hand-turning and shaping. It may be to the interest of the manufacturer to at least investigate just what this machine will do. Automatic glue-jointers make better joints than does the hand-feed jointer. They are as accurate on short as on long stock.

A machine with which nearly every furniture manufacturer is more or less familiar, although many factories which could use such a machine have unfortunately not investigated just what the machine will do, is the Linderman automatic dove-tail glue-jointer. This is unquestionably the greatest waste-saving machine on the market to-day. Another admirable feature about it is, it joints different thicknesses together automatically and does not tear the wood. It is my opinion that table, panel and manufacturers in

many other lines cannot afford to be without this machine.

Many furniture manufacturers manufacture their own dowels, and rightly so. We have two machines in our plant. An up-to-date dowel machine will pay for itself within a surprisingly short time.

The veneer room should be equipped with a re-dryer, instantaneous glue-cookers and the latest style of hydraulic or power presses. Many highly intelli-

Sufficient area must exist for the storing of as large a supply of working material as may be necessary, without interfering with passageways. The open areas must be wide enough to permit the passage of two trucks in the aisles and for the side-tracking of trucks around machines.

Many furniture manufacturing plants are installing motor drives. The motor drive eliminates flapping belts, lineshafting, idlers and pulleys, which waste considerable power before it reaches the machine.

The success of the furniture manufacturing plant depends very largely upon its manager. To achieve success the manager must possess that marked ability which is appreciated only by men who have had executive experience. The manager must be keen to stop all leaks and quick to adopt all known agencies for promoting his business.

Features of Consequence in Veneering

Matching up the Material—Care of Stock—Inspecting the Work—Value of Technical Knowledge of Veneers

By A. T. Deinzer

VENEERING, as nearly every one knows, is the art of attaching thin sheets or leaves of wood, ivory, etc., to the surface of wood or other material of a less costly or less ornamental description. It is thus in connection with wood, ivory, etc., equivalent to plating in the working of metals.

Veneers are either cut or sawn from solid blocks or planks. Veneers are also made from certain straight or plant woods with cutting tools, either by the process of planing or turning. The ancestry of veneering can be traced back to the first century, yet it has been a very crude industry until recent times. But the veneer business is now being specialized along other and well defined lines. The increase in the consumption of veneered furniture has been more in evidence during the past six years than at any other time. Some people to this very day consider veneered pieces as inferior, an outside show, mere pretense.

The enormous growth of the veneer industry and the experience of furniture manufacturers is sufficient proof that built-up stock is far better all around than is the solid. What a very simple matter it is to match veneer, especially flitches taken from the same log. It is most certainly impossible to get such results where solid lumber is used. The superiority of veneered work as to reliability has also been demonstrated within the past few years.

Veneered work causes many manufacturers no little worry, and this for the reason that they and their workmen have so little scientific knowledge in the laying of veneers. As a result of improper veneering the finishing department may also show up defects, or these defects may present themselves sometime after the piece of furnituer has been sold.

A Job That Went Wrong.

A few days ago I saw a beautiful crotch mahogany veneered davenport which was manufactured more than a year ago and shown as a sample at a furniture exhibit. The cross-band veneered top of this davenport looked like the Detroit river on a rainy day. It is my impression that the veneer was laid as would be ordinary veneer. No effort was evidently made to smooth the veneer. The top appeared to be in first-class condition after being finished but after some time it became badly checked. Hundreds of irregular hair-line checks were visible.

It is also possible that the glue was laying the crotch veneer. The chilled glue would, of course, prevent the swelling of the veneer. Again, the cauls might have been overheated. It is, unfortunately, the opinion of many veneer men that one must have cauls heated hot. This condition I recently found to prevail in one of the most popular high-grade table concerns in this country. We know or should know that overheated cauls not only burn glue and destroy its adhesive qualities, but on soft woods they drive the glue into the wood so far that there is no adhesive left on the surface to hold the work. Overheated cauls also cause blisters.

The Foreman and Superintendent

Every veneer department should have a foreman who is an expert at the business. In the small factory it should be one of the duties of that foreman to inspect all the stock manufactured in this department. Positively no work should be sent to the cabinet or finishing rooms unless it is perfect in all that the name implies. The manager, superintendent or foreman may here claim that the veneer department is so well organized in his plant that all work is automatically and perfectly accomplished; hence, why waste time inspecting work?

No matter how well your plant or veneer department may be organized, it is absolutely necessary to inspect all goods carefully if results are to be obtained. Core stock and face veneers should also be carefully inspected. If found imperfect, reject them. Do not permit imperfect work to leave your plant. It very often takes a few poor jobs to entirely cripple a well established business. If Jones does not furnish the right kind of goods, Smith will. And, what is more, Smith will get the business.

Too little attention is paid by most purchasing departments to the selection of choice veneers. Low price looms up so greatly that they cannot or will not consider what havoc the goods may cause in the production of their line of manufactured goods. When the veneered work is of inferior quality or figures do not show up, the management blames the unfortunate foreman and workmen, quite frequently accusing these men of not understanding their business. How many manufacturers appreciate or will admit that the trouble

in the veneering department may be solely due to their shortsightedness and that their men are as little to blame for the quality of the work, inferior material considered, as they would be for an unexpected fall of rain.

How many buyers of veneer will examine the fiber of the veneer when selecting samples, or compare the perfect sample with the veneer when the lot arrives at the place of business. Veneer should be cut in such a way so as not to injure the fibers. Veneer cut in such a way so that the fiber is broken, and the fiber pressed together again is going to cause trouble. Many buyers do not know this fact.

Rules for Veneer Buyers.

In fact, many buyers are not even familiar with the veneer grading rules. They of course know all about the rules governing the measurement and inspection of lumber. They insist upon having every board measured and inspected; yet why do they not have the defects in the flitches of veneer inspected. Again, in a number of factories the number of feet contained in the flitches is determined by some inexpensive workman and if the result corresponds with the number of feet billed, the invoice is checked as O.K. and the veneer manufacturer or jobber favored with his check covering it.

Do not buy the defective product. Fortunately most manufacturers of veneer will not misrepresent their goods, and when they get an imperfect lot they put a low price on it. If the buyer therefore snaps at these bargains of defective veneer he must blame no one but himself when customers again kick about the bum lot of veneered furniture they received, deducting an enormous amount or refusing to accept the goods. A manufacturer of high-grade furniture cannot afford to be supplied with inferior veneer. If you are, however, looking for this class of veneer, you will have no trouble getting it. Your customer insists upon quality, if therefore you want to satisfy him and enjoy his patronage you must do likewise.

Good veneer buying is not shrewdness. It is knowledge. It is surprising that at this day and age so many buyers will name lower figures than the price quoted and insist that they will pay no more. These buyers occasionally get some bargains thereby, but it does not take the intelligent veneer salesman a long time to understand his man.

It should not be understood that the highest priced material or the best quality of material in a given class is the best. This is not true by any means in the veneer business. We can arrive at what is best for our business only by a series of experiments and a careful study of the work in question.

Care of the Veneer Stock.

Veneered stock must be kept straight until all moisture is out of it. Veneered stock which is kept straight from the time it leaves the press until it is thoroughly dry will never warp under normal conditions. When I state that veneered stock must be kept straight, I mean that it must be allowed to become thoroughly dry before it is so released that it can warp if it is inclined to do so. Carefully pile all stock with strips between every piece, so as to let the air circulate and dry the stock thoroughly. In order to keep the stock straight carefully sized strips must be used and weight added on top of the piles to keep the stock down so that it will retain its shape.

Much of the trouble in our veneer rooms may also be avoided by a judicious selection of core stock to match the texture of the veneer with which it is to be used.

Dry veneer is essential to good veneering. One should not get the stock partly dry but as thoroughly dry as one can get it so that it will be inclined to swell rather than shrink. If veneer is green it will do some shrinking after it is glued on the body. This shrinking means fine hair-line checks in face veneers. These checks will generally be noticeable about the time the goods are ready to rub after being through the process of finishing. Many managers, superintendents, foremen and workmen themselves are under the impression that the veneer dried by the manufacturer is in fit condition for use when it reaches the consumer. It must be remembered that veneer is very thin and will easily take on dampness; the result is, that veneer will swell to a considerable extent. In addition to the dampness in the veneer, the moisture in the glue should also be considered.

The writer was at one time the superintendent of a very high-grade table-manufacturing concern. The goods manufactured by these people enjoy a fine reputation to this very day. Our veneer foreman well appreciated how very essential dry veneer is if results are to be obtained. Unless his veneers proved to be in proper condition, he would not lay them. This branch of the work received his personal attention. Did these people experience the common trouble of veneer checking? Not during the time I was associated with them. During my stay with this concern I did not see a single piece that did not pass inspection as far as veneering is concerned.

Dashboards Made in Table Plant.

At this plant we also manufactured a great number of dashboards for one of the most prominent automobile concerns in this country. It might be stated that we had an inadequate veneer-room equipment, but regardless of this fact we manufactured high-grade five-ply dashboards at a surprisingly low price and the proprietor realized a very fair profit. The dashes were so well manufactured that the manager had no trouble in locating repeat orders, and my understanding is that the automobile company paid these people a little more money than they could buy the dashes elsewhere for, but they were assured of uniform quality of good work. As much care was exercised in the veneering of these dashes as would be exercised in the veneering of expensive table stock. The words "good enough" were unknown to the workmen in the veneer department. The job must be perfect. The dashboards proved to be a very good side line for these people and in no way conflicted with their table work.

Much time is very often wasted in the handling of stock from the time the glue is spread onto the first piece until the pieces are put under pressure. So many veneer men claim that heated cauls will keep the glue warm that in many cases as much as 20 minutes may elapse before the stock is put into the presses. It is not good practice to permit the glue to stiffen before pressure is applied.

The process of laying high-grade veneers so as to avoid danger of checking is attention to the following four points:

A stiff hot glue.

A **minimum** time between the laying of the veneer on the glue and the screwing down of the press.

Muslin glued to underside of veneer.

The veneer must be absolutely dry.

About two years ago the writer wrote a letter to

one of the largest piano manufacturing companies asking whether they would kindly state their experience with the crotch mahogany cases they manufactured. They stated that when finding a piece of mahogany veneer to be particularly hard, and a crotch is used, it is impossible to hold it. They also stated that they even tried it extra thick, cross-banding, but the result has always been the same and that sooner or later the checking shows. It may not show for a year or two, but it is bound to show in the end, and, as their pianos are guaranteed for a long period, they may be called on to make good after a lapse of years. Crotch mahogany may cause trouble and after all what it needs is experience. Our own experience with end wood veneers has been very satisfactory indeed the past year or two.

The temperature of the veneer and finishing-room is also a factor of no little importance. Good veneering cannot be done in a cold room. We know that the temperature in the average finishing-room is approximately 70 degrees. This temperature may be used in the veneer gluing department, especially during cold weather. There should also be an abundance of fresh air and good circulation to carry off the moisture of the stock in the presses. This point has not received the consideration it so very much deserves in woodworking plants.

Be sure to have the core stock perfectly smooth. Knife marks from the planer, jointer or sticker should not be visible on core stock. If the wood is bruised after leaving the machine the old-time method of sponging the wood will raise the bruises and will therefore improve the stock very much. Every old cabinetmaker is familiar with this method. Thin veneers will not stand much scraping and standing. Much of this can therefore be eliminated if the core stock is smooth and in proper condition before the veneer is applied.

Sanding the Veneered Work.

Facilities for sanding veneered and other wood work are improving right along. It must be remembered, however, that in order to obtain good smooth work the stock must be thoroughly dry. A good quality of sandpaper or sand belt must also be used. Too much pressure on the rollers of the sander should be avoided. Do not endeavor to see how strong the machine will feed. With more pressure than necessary, the friction on table or sand guards is sometimes so great that the stock becomes stalled and causes gouges and other defects. The pressure should be no more than enough to carry the stock comfortably through.

The endless-bed sander has brought out some interesting points of the efficiency in the new sanding machines, especially so in sanding short veneered or solid stock. It has been demonstrated that these machines sand veneers with fine results. The capacity of the moving bed is also greater. The endless-bed sander has reduced the cost of finishing and has succeeded in making better finishes.

Always sand with the grain just as you would cut with the grain with a planer to get smooth work. Sanding against the grain will produce holes and unsightly scratches which are not very easily removed. When sanding by machines, do not expect the sander to cut stock to size. The sander is used only to produce a straight polished surface. Size your stock on the planer. If the stock should be a little uneven to produce an extraordinary cut it is better to run through twice. The principal cutting should be done by the first cylinder; the second cylinder should take out the scratches, and the third polish the surface.

Moisture Causes Much Trouble.

Do not sand freshly glued-up stock. In many factories veneered stock is sent to the sanding machine from 5 to 10 hours after pieces have been veneered. All this stock must first be piled between cross-pieces as already stated and sufficient time allowed for the moisture incident to gluing to thoroughly dry out. The more time alowed the better. Several piano manufacturers keep their stock piled up from one to three months before it is sent to the trimming-saw and sanding machines. It will pay every manufacturer to reserve a portion of his building for a veneer dry-room. An advantage of such a room would be that the temperature could be controlled, hence the drying process hastened.

Great care should be exercised in sanding this face stock. Here again our core stock plays an important part. Unless this stock is perfectly smooth as has already been stated, we are going to have trouble. Core stocks should not have lumps and humps for the natural consequence is, as everyone knows, in order to get a smooth surface, it will be necessary to sand through the face veneer. The work cannot be done too well. A little more time in preparing the core stock, laying the veneer and properly sanding, will save no small amount of money in the way of repairs.

After the stock is sanded properly it must of course be stained. Do not trust this work to some $3 per week boy. Some furniture manufacturers employ boys to do the staining and filling; a serious mistake indeed, and if their work is inspected, one will find sufficient reason for criticism.

One great fault is that the veneered work may be dipped in water stain and is sometimes (especially by careless boys) permitted to remain in this stain solution for from five to ten minutes. Again, it may not be thoroughly wiped off, hence, the moisture has a chance to soak through the face veneer. What the consequences will be need hardly be stated, for nearly every manufacturer of furniture has had experience along this line.

The modern polisher, which is a machine supplied with either fairly coarse or fine paper, can do considerable damage to veneered stock. Only operators thoroughly understanding their business should be chosen for these machines.

A common mistaken idea in many furniture factories is, that the furniture should not be sponged and sanded before the stain is applied. In many cases the work is given two coats of stain, the sanding being done after the first coat. The sponging and sanding should be done in the cabinet-room before the goods reaches the finisher.

Sponging and Sanding.

The finishing foreman of the table factory where, as already stated, I had been superintendent, called my attention to a lot of very fine solid mahogany library tables which had been treated with mahogany water stain. The grain was badly raised, and what this means on a very costly price of furniture every reader fully appreciates. The cabinet foreman had been instructed to deliver no goods to the finishing department unless such goods (especially mahogany) had been properly sponged. I was not a little surprised at this condition and inquired of the cabinet foreman. Upon closely questioning him he stated positively that

the tables had been properly sponged and sanded in his department. This statement was disclaimed by others. It was my duty to sift this matter to its very bottom so I looked up the cabinet-maker who worked on the job. He stated that he did not sponge the work.

I was then informed by the cabinet foreman (who by that time became quite warm under the collar) that the sponging had been done by some of his men working in another room. This man tried to gain his point by sponging a piece of hard mahogany molding which had been run on the sticker. The molding was handed to me and I was asked whether any raised grain was visible. It was a laughable excuse indeed. The evidence of the raised grain was in the staining room. Then, was it possible to raise the grain on the piece the foreman used for the purpose of demonstrating? Most assuredly so. A few strokes with a sandpaper block and the application of a little water would give us the same result.

Now what was the difference between the colored water the finisher used which raised the grain and the clear water which the cabinet foreman claimed would not do so? Again, is it not far more economical to sponge the veneered stock before the stain is applied than to give the work two coats of stain sanding after each coat? If the foreman's statement is really true, then I can only say that the job of sponging was a blamed poor one.

We know positively that water will raise the grain of wood and this is the only objection we have to water stains. Water stains penetrate deeper than do oil or spirit stains. They also dry slower than other stains. Experience has taught us that spirit or oil soluble colors when mixed with alcohol or other solvents do not stand fast to light and for that reason the best finishers use these colors only as a glaze over stains that they buy to change the shades from one tone to another.

Many of the dyes now on the market will give trouble in the hands of the inexperienced. It requires knowledge of chemistry and no little experience to prepare stain as used by the wood finishing trade today. It may be well to suggest to finishers mixing their own stains that if uniformity of color is desired, it is absolutely necessary to weigh the powder and to measure the water. One must also conform to a certain temperature. All stain powders dissolve better in hot than in cold solvents. Inflammable stains should be heated over a water bath.

Stains and Satisfaction.

One great trouble with many finishing-rooms is, that the buyer of stains will buy from any Tom, Dick or Harry, and what especially interests him is the low price. The finishing department, therefore, receives many different makes of stains and as a natural consequence no standard color can be chosen. The result is differently colored goods. Tie up with a good stain house and buy your stains until someone else has proven conclusively that he can produce absolutely the same thing at either a lower price or a better article at the same price.

Every modern furniture manufacturing plant should be in a position to test the chemical and physical properties of all material purchased. A good testing department will pay for itself within a surprisingly short time. Uniform colors will be assured.

I may here add that the proper temperature of the room where veneered goods are finished should be from 70 to 75 degrees.

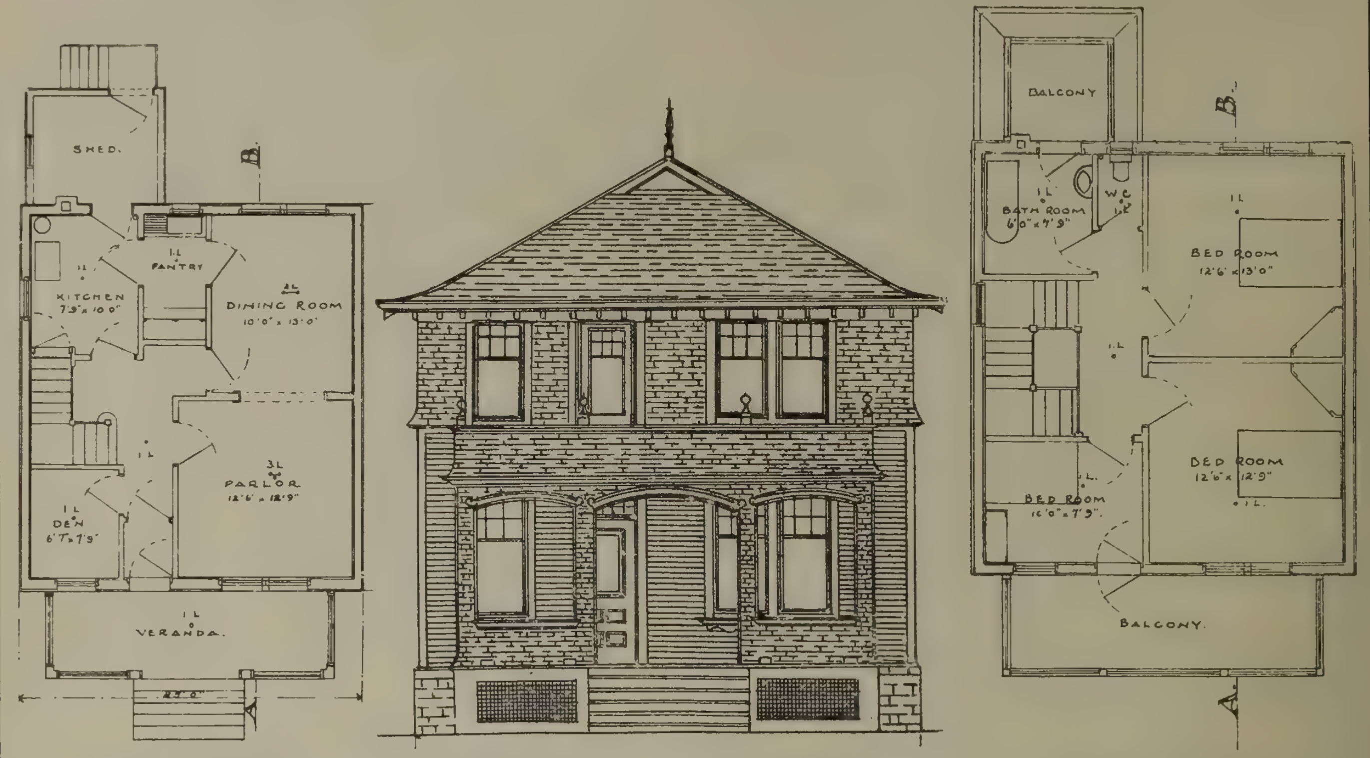
Large Versus Small Sawmills

A. E. Watts, of Wattsburg, B.C., is a firm believer in the economy of erecting small sawmills close to the timber, in preference to a plant of large capacity so situated that its supply of logs has to be secured from a distance. This idea was worked out by Mr. Watts when building his Wattsburg and Proctor plants, and apparently with a fair measure of success, he being rated among the very wealthy citizens of the mountain country, his timber holdings alone being in the neighborhood of 600,000,000 feet. Several months ago Mr. Watts established another small mill on the heights back of Wattsburg, the output of which has been flumed two miles to the planing mill, a distance of about two miles, saving considerable in the cost of handling. It is planned to keep the new mill running most of the winter, sledding being substituted for fluming during the cold weather. When a good snow road can be made it is confidenlly anticipated that from 6,000 to 7,000 feet of lumber can be carried on each downhill trip. The Proctor mill, recently destroyed by fire, may not be rebuilt on the old site, the booming ground being in an exposed position. Instead Mr. Watts is planning to put in a small mill at Portal, near the United States boundary, where he has extensive limits.

Value of the Rip Saw

A rip saw is one of the most handy machines imaginable about the shop because there is really more ripping than anything else, especially where a carpenter uses rough framing. By changing saws the rip saw can be converted into a cross cut and by adjusting the extension of this saw up through the table quite a lot of work can be done that usually requires a hand saw. The operator can cut in gains, tenon shoulders, and do all sorts of things of that kind. By putting on a bunch of saws or a dado head he can cut the gains, rabbet and do various other things. By putting on a slide form for cutting shapes the operator can cut the ends of rafters, cut miters, and joist bridging, make wedges, etc.; in fact, there is hardly any limit to the possibilities of a rip saw table when it is in the hands of a man of some ingenuity. There is one thing, however, the average carpenter must guard against in taking up the idea of the small gasoline engine for operating a few woodworking machines, and that is, the tendency to go too far in the matter. An opportunity properly handled can and will do a vast amount of good work for the carpenter, but if it is not handled right it is likely to do all sorts of contrary things, and when overloaded it is a foregone conclusion that it will balk.

If other lumber concerns in the province of British Columbia fall in with the opinion of the Small-Bucklin Company, of New Westminster, Hindus employed in British Columbia's greatest industry will soon become a negligible quantity. President E. H. Bucklin states that he has reached the conclusion, after a tour through American plants, where only white men are employed, that the latter are the most valuable workers despite the fact the yare paid $2.25 per day, which is 50 cents more than the remuneration to the Hindu class. In pursuing this policy the Small-Bucklin Company have now weeded out from among their two hundred employees all but thirty of the Hindus and these will be displaced as soon as suitable white labor can be procured.



First Floor Plan — Front Elevation — Second Floor Plan

A Small Town or Country Residence

WE give herewith a well planned residence, designed by Wm. Bruce, architect, Winnipeg. The house has a number of desirable features and can be erected at a reasonable figure in almost any locality.

The following are the specifications:—

Excavate: For the basement as shown on the drawings. Lay the foundation with good concrete or with large stones. Walls to be built with large flat well-bedded stones, all well bonded, bedded and jointed solid in good lime mortar, pointed inside, and the outside coated with cement mortar. Beam fill and point around all timbers. Lay weeping drains outside of the basement walls and connect to catch basin. Build a flue 9 x 9 inches, inside of 4½ inch brick, well pointed and plastered, build two corbels to carry ends of floor beams.

Carpenter Work: Timber to be of good hard pine, spruce or fir, selected free from sap or shakes, 6 x 6 inch pillars and 6 x 8 inch beams in basement. Ground and bedroom floor joists 10 inch by 2 inch and double at trimmings. The rafters 6 inch by 2 inch, ceiling joists 4 inch by 2 inch. Wall standards 4 inch by 2 inch, 1 foot 6 inch centres, strong plates top and bottom, double thickness at angles and openings. Strong boarding outside and inside carefully covered with extra thick paper outside and inside. The outside finished with narrow siding up to the vertical eaves, and above that walls to be covered with narrow cedar shingles and ornamental bands; the inside strapped for lath. The roof to be boarded and covered with extra thick frost proof paper and covered with strong narrow cedar shingles and finished with ornamental ridges and terminals as shown on drawings. The veranda enclosure will have standards, boarding and narrow shingles on the outside. The pillars will also be shingled with return boards moulded on both edges with similar circular soffits and circular trimming at top with ornamental ends. The front balcony to be finished in a similar manner and with 3-inch deep coping and ornamental terminals. The inside of the veranda to be finished with ¾ Gt. T narrow boarding, also the ceiling with mouldings, and prepared floor of balcony for sheet metal with 1 inch thick narrow boarding covered with thick paper. Balustrade of back balcony to be finished with 1½ inch balustrade and strong top and bottom rails and corner posts, all as shown on plans. Window and door frames and cases with all trimmings to be strong and well made with 1¾ inch sashes, glazed with strong sheet. Allow for the storm sashes to be glazed fitted and fixed for frames and wire screens on all windows and outside doors. Doors on ground floor to be 1¾ inch thick and bedroom doors 1½ thick. Allow for moulded trimmings, skirtings, table top and sink, cabinet in pantry with doors and shelves, picture moulding in parlor, wall lining in kitchen and pantry. Two storm doors and for supplying and fixing all hinges, locks and knobs and plates complete and all fastenings for windows. The principal stair to be constructed with strong stringers, moulded treads and risers with breast mould, two newel posts 1¾ inches square and turned balusters, two on each step, and a strong moulded handrail. Supply similar steps at front and back and a strong stair to the basement.

Plumbing: Supply and lay strong 4 inch cast iron drain, a 4 inch sewer ventilating pipe at chimney flue, a 4 inch drain trap with air inlet from outside, 4 inch

branch to W.C., and 4 inch vertical pipe at bathroom with all the necessary branches for vent pipes. The sewer ventilator and house drain vent pipe to be well protected at top covered with felt, frost proof paper and sheet iron. The water main to be ¾ inch with ½ inch branches. The bath, basin and sink to be of best white enamelled iron, sizes shown on drawing with pipes, taps and hot and cold water. W.C. to be of best white fire clay, with hardwood seat, low cistern and pipes complete. The wall head gutters to be 4 inches by 5 inches, moulded of sheet iron, the pipes 3½ inches in diameter. The rain water tank to be 6 feet by 6 feet complete.

Plaster: Lath to be of good quality and plaster of the best two-coat work, finished straight and smooth.

Heating: The hot air furnace to be sufficient size to maintain a temperature of at least 70 degrees Fahr. inside when outside is 20 degrees below zero.

Electric Wiring: Supply and fix all electric wiring to the outlets shown on the plans and for five wall switches.

Painting: Paint all outside work, including shingles, three coats, metal, two coats. Inside work, two coats. Stair and parlor to be grained and varnished and all left clean. Glaze with strong sheet glass and leave all work clean.

A Stairway of Unusual Construction

THE seemingly simple things which turn out to be difficult when examined intimately are not so unusual as they are unexpected and the stairway illustrated by the drawings accompanying this article looks simple enough from the floor plan. There is not a thing unusual when looking at the elevation which is given here, except that a regular base board or room base is indicated above the nosing line at the second floor. This is shown at the top of Fig. 1 and is occasioned by the detail of the wall, as the lower part of the building is of brick and has a thicker wall than the upper, which is studded and sided. This offset is also shown in the wide nosing on the floor plan.

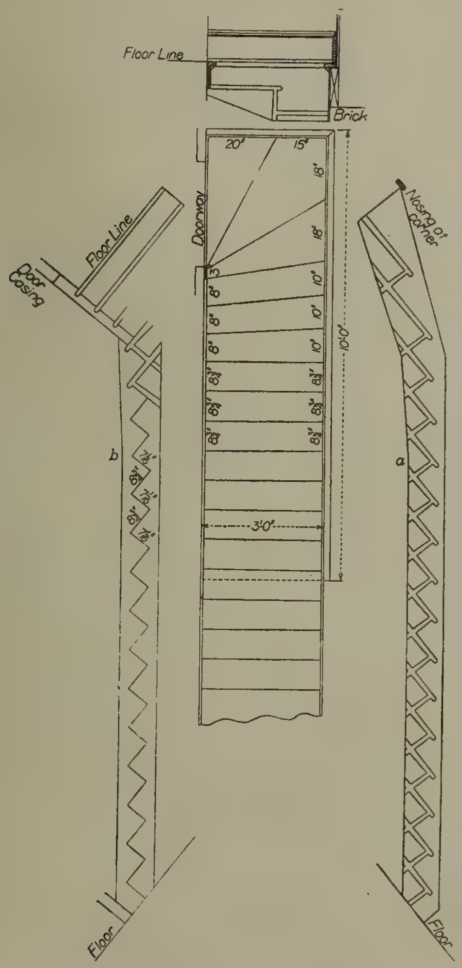


Fig. 1—Plan of Stairs

It will be seen that the stair starts against a door casing on each side at the lower floor and the rise is rather high and the run rather short. For this reason the architect has fudged a little and made three near-winders before putting in the three real or large winders.

The flight goes up regularly until it reaches the 12th tread, but here regularity ceases and the right-hand end of the tread is made 1¼ in. wider and the left-hand end ¾ in. narrower than its predecessor. The next two are the same and then come the winders.

A careful examination of the layout for the right-hand string will show that where the treads increase in width the nosing line falls below the true line of the rake and that while the top of the string is kept straight for purposes of convenience until it makes the

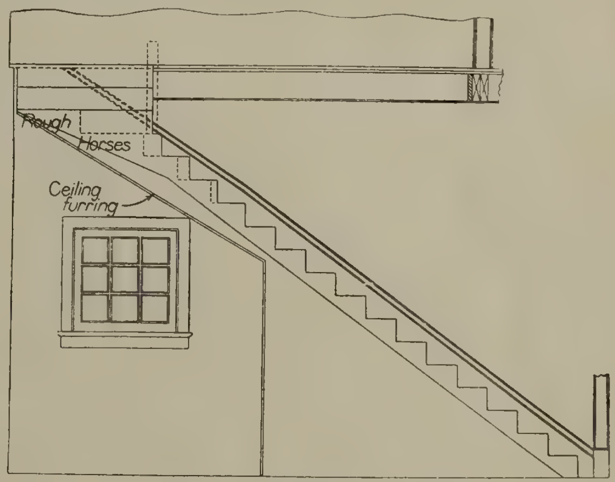


Fig. 2—Side View of Stairs

drop for the winders, the nosings recede from the edge farther at each step.

Just the reverse occurs on the left-hand side, where the treads are narrowed, and from the point b to the intersection of the winders the nosings advance toward the edge of the string. In this case we increase the width of the string to hide the discrepancy. On the other side of the stairs the change is not so noticeable on account of the fact that a small increase in a wide space is more obscure than a small decrease in a narrow space.

There is nothing unusual about the regular winders except, perhaps, that the space from the treads to the nosings along the wall is filled with wood, as shown at the top of Fig. 1.

The next difficult thing is to find a place for the end of one string board, the ends of two threads, three risers and one nosing all to stand in the same vertical line. This part of the work was not set out by the

architect, and, in fact, he did not furnish any of the details and only the ¼-in. scale drawings. But the difficulty was solved by using a long plinth under the door casing at the head of the stairs and have it thick enough to receive the end of the stringer and also the end of the last riser.

Another feature of the stair is the fact that it is sealed up under the highest part to give access to a window and also furnish a place for a work bench in the alcove thus formed, for this building is a garage below and a dwelling above. Fig. 2 gives some idea of how this is done and the irregular spaces under the winders are furred down to the straight ceiling line just above the little window.

Framing Window Openings

GENERALLY, in these days, if a man makes a weak point in a frame building it is found in connection with framing the window openings, says J. Crow Taylor. Some excellent houses have been seen that have been made weak enough here to cause sagging. It is partly due to the fact that there are many double and triple windows in vogue now. Some of these window openings are rather large and the carpenter in charge of the work doesn't take into consideration the matter of weight and strains as he should. The general practice is to use a double header of two pieces of 2 by 4. This is good enough for single windows, but where there are large openings for double and triple windows it would be a much better plan to put a comparatively heavy beam across the top of the windows to help support the upper wall. Two pieces of 2 by 6, nailed flat together, so as to make 4 by 6, makes a good top header, or if the opening is unusually wide, 2 by 8 should be used instead of 2 by 6, especially if it is a side wall carrying joists and rafters.

Quite a lot depends on which wall of the house the openings are in. The end walls, where there are no joist ends resting, and probably an overhead joist to help support, makes a very easy place to frame in an opening and be safe, but in the side walls, where both joist and rafter ends rest above and bring weight down upon them, all openings should be heavily framed overhead.

It does not take much to support the windows. That is not the point. What you want to do is support the upper frame work and to do this you must study and consider the weight being carried above and frame accordingly even if it takes a beam of two pieces of 2 by 8 to make the header over a window or two pieces of 2 by 10. It is better and cheaper in the end to put it in the frame in the beginning than to have the building sag and spoil the job. Really an ordinary double header of two pieces of 2 by 4 is not much in the way of strength to carry a frame, especially when the header is simply toe-nailed in.

A better plan than to toe-nail in is to leave out doubling the studding along side of the frames until the headers are put in. Put up a single stud, then get the headers in and spike straight through, after which put in the extra stud for doubling and spike it, which gives a much better job than the other plan followed of toe-nailing headers in window and door openings.

Always tip a plane on its side when laying it on the bench so as not to dull the iron. For the same reason always raise the plane from the work on the return stroke.

A Scheme for Saving Belting Expense

SOME millmen may be confronted with the same problem at times that I was several years ago when I took charge of a well-sized woodworking plant in the southern part of New York State, writes R. Neubecker, in Wood Craft.

While this plant was a pretty well up-to-date place, I found a large double fan being driven by a 10-inch wide, crossed, leather belt—conditions in this place necessitating the fan being driven in an opposite direction than that in which the line shaft ran.

Of course, the easiest thing that could be done when fan was installed was done by running belt crossed over, Fig. 1, from the pulleys A to B, and let it go at that. The distance between main shaft and pulley centers on fan being about 14 to 16 feet, and as belt was 10 inches wide and ran at high speed the reader can easily imagine how long a belt lasted under these circumstances. Consequently we found that belt would be burnt and worn out in from four to six months. This practice was making a big inroad into the profits of the company.

After pondering over this subject for several days I told the manager that I had an idea of saving some of the belt expense by running belt flat in idlers in-

Fig. 1—A belt that went to waste

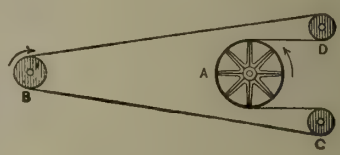


Fig. 2—A belt that wore well

stead of crosswise and still have fan running in same direction as before. He said it was impossible and couldn't be done. Finally he smiled and said: "Well, Dick, I am from Missouri and you will have to show me."

Idlers Come in Useful

I told him that I would. At the next shutdown of plant for repairs he told me to go ahead with my idea, and, of course, I did.

First I erected two idlers as shown in Fig. 2, C and D, about 6 feet away from line shaft and then ran belt on flat ways by arranging to have it run around idlers before running over the main shaft. The idlers were so arranged that any slackness in the belt could be taken out by tightening the hold-up rods at will.

It is needless to say that a large amount of power was saved through this arrangement. And not this alone. The very same belt that was put on six years ago is still doing business, and in a recent visit to the plant it looked to me as though it would be good for at least six years more of service.

In this time under old conditions at least eight new belts would have been required had the belts continued to run crosswise as in first place, and consequently this may not be such a bad idea to adopt in similar cases.

The small expense incurred in making this change will be soon found to return big dividends in the amount of power saved and the cutting down of the purchasing bill for belting.

In measuring with a rule, tip it on edge so that the dimension marks are adjacent to the piece being laid out, and in taking a series of dimensions start from one point only.

Plans for a Sash and Door Factory

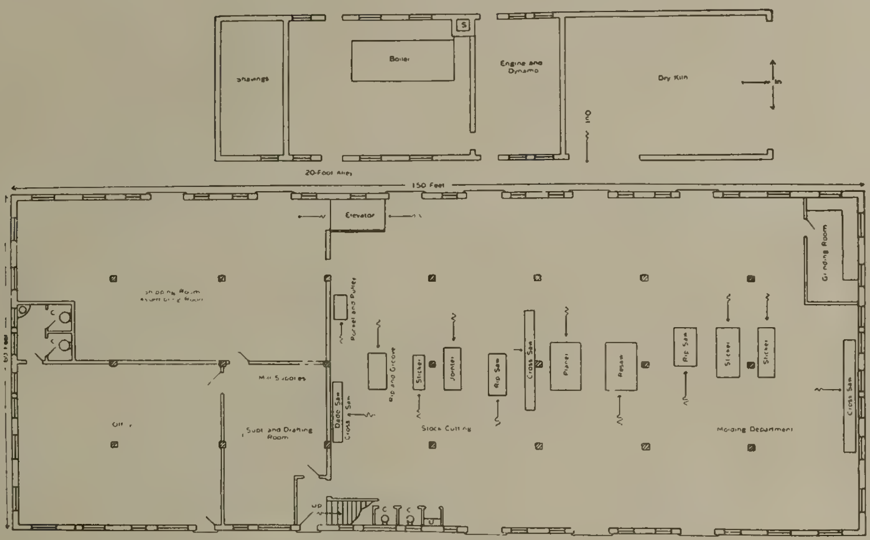
THE request was made recently for suggestions concerning a factory to employ 75 to 100 men. In the absence of more definite information for such a plant, as size of lot or ground, directions of streets, etc., and the kind of work to be done, the writer has taken it for granted that it is to be one to manufacture wooden articles such as sash, doors, mouldings, frames, etc., such a line calling for a great variety in machinery and kinds of work to be done, the work ranging from common boards to high-grade interior finish.

To begin with, I have used the same dimensions as suggested, 60 by 150 feet, and the dry kiln in line with the planer. Note the arrangement of building supports and machinery, also the arrangement and size of doors. The writer has in mind that no material is to be carried, but for all long stock lumber trucks are to be used, and for shorter stock, after being cut factory trucks are to be used.

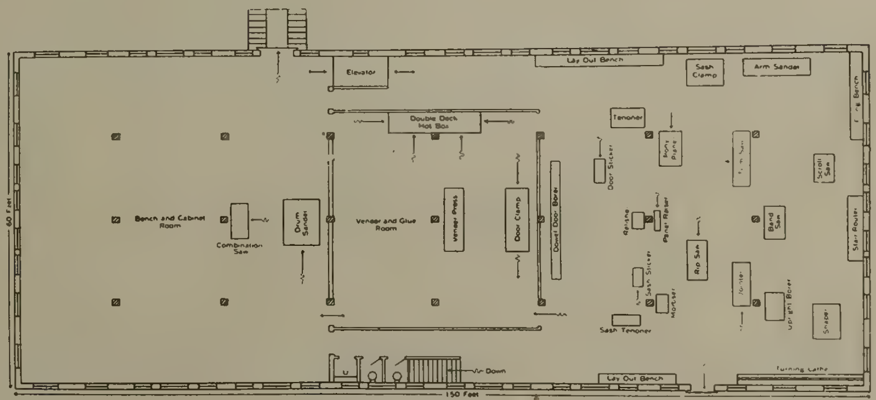
The factory is to be two storeys high, with lower floor about 1 foot 6 inches above the surrounding ground. A small incline makes it possible to push a loaded truck into the factory and up to the machine, and work therefrom, without unloading and in turn reloading another lumber or factory truck. Note the arrangement of machinery and direct course from kiln or otherwise to planer, direct discharge for resaw, moulding or stock-cutting department. The arrows indicate the direction in which these machines receive and discharge the stock, ready for the next machine to receive it, without extra handling. Note also the central location of the elevator, making the route as short as possible for receiving and delivering materials. The location of stairs and superintendent's office is central and gives control to this official and saves steps in directing work.

At the second floor we unload stock from the elevator in either direction, also unload in the same manner, if desired, for unloading wagons, but as this is a two-storey factory, most of the finished stock will be loaded on wagons from chute, with side steps to wagon, and no elevator used. The writer has found this to be a very handy arrangement, and saves time.

The various departments explain themselves. Those using the largest volume of material are closest to the elevator. A new departure and a good one, is the veneer and glue room, centrally located for the convenience of the bench men.



Material Factory—First Floor Plan



Material Factory—Second Floor Plan

Heat Economies in the Boiler Room

By A. H. Blackburn*

The first step toward improvement of steam plant economy is an analysis of losses. The largest item of power plant expense is the fuel bill, and at the very beginning of the process of utilizing the fuel, we encounter one of the greatest percentage losses. To burn each pound of fuel, from 18 to 24 lbs. of air are, or should be, introduced into the furnace to bring about complete combustion and to set free the 12,000 to 14,000 heat units that the pound of coal may contain. Assuming that 20 pounds of air are used and that to heat each pound of the gases of combination one degree Fahrenheit will require 0.23 heat units, the gases resulting from 1 lb. of coal require $20 \times .23 = 4.6$ heat units to raise their temperature 1°F. and 12,000 to 14,000 heat units would raise the temperature of this gas approximately 2,500 deg. F. The temperature in the furnace after complete combustion should therefore be about 2,500 deg. F. above the temperature of the atmosphere.

The temperature of steam at 150 lbs. gauge pressure is 366 deg. F., and if all the heat in the gases above this temperature could be transferred to the water and steam of the boiler, the efficiency of the boiler, assuming an atmospheric temperature of 60 deg. F., would be 88 per cent., leaving only 12 per cent. of the heat of the coal to escape in the chimney gases at a temperature of 366 deg. F.

As a matter of fact, however, no boiler reduces the temperature of the gases to the temperature of the steam. To do so would require an infinite extent of heating surface, for as the temperature of the gases approaches that of the contents of the boiler, the rate of heat transmission per sq. ft. of boiler surface falls lower and lower, as it is proportional to the difference of temperature between the gases and the water in the boiler. There is, therefore a limit to the boiler surface that it pays to put in. Beyond a certain point the interest and other fixed charges on extra boiler surface would amount to more than the value of the heat regained. Commercial practice has established this limit of surface at about 10 ft. per boiler h.p., but experience shows that a h.p. can be produced from much less surface—from 3 to 5 sq. ft. or even less—and in some plants it is becoming customary to drive the boilers at 60 per cent. above the nominal rating of 10 sq. ft. per boiler h.p. It should be borne in mind that the question of heating surface has, in reality, nothing to do with the steam liberating capacity. No matter what the extent of the heating surface the boiler must have large enough steam drums or other provision to separate the steam from the water without priming.

With the number of sq. ft. of boiler heating surface ordinarily employed to produce a boiler horse power, it will be found in commercial plants that the chimney gases escape at temperatures between 450 deg. and 700 deg. F., representing a waste of from 15 to 30 per cent. of the heat of the coal, depending partly upon the amount of air used to burn a pound of coal. In a 1,000 h.p. plant, running 24 hours a day for 360 days per year, with a load-factor of 50 per cent. and burning coal, costing $2.50 per ton, a 25 per cent. waste of coal amounts to $6,000 a year, not counting handling charges, and it will therefore pay to study how it may be wholly or in part prevented. This problem has engaged the attention of steam engineers from the first, and many solutions have been proposed.

Chimney gases can obviously be used only for heating boilers at a temperature lower than themselves, and in order that the transference of the heat from the gases may be rapid enough to make it worth while, the body receiving heat should be at a considerably lower temperature. The contents of the boiler are at too high a temperature to utilize this heat. The most available means for utilizing this energy is in heating feed water. To burn a pound of water at 60 deg. F. into steam at 150 lbs. gauge pressure requires 1166.5 heat units, of which 309.7 are consumed in heating the water up to the temperature of ebullition, namely, 366 deg. F., while the remaining, or 856.8 heat units, are used in turning the water into steam at the same temperature. The heat required for merely heating the water is thus 26 per cent. of the whole, which, as will be noted, is about equal to the percentage of the heat of the coal present in the flue gases when they escape from the furnace.

It may be asked why it is not possible to feed the water into the boiler cold and to allow it to re-capture this waste heat from that position. Aside from the injurious strains set up by feeding a boiler with cold water, there is another important fact that must not be overlooked, and that is, that the transmission of heat from the gases to the water is proportional to the difference between the temperature of the two, and if we can bring the cold water before it has entered the boiler, into contact with the hot gases it will absorb the heat much faster through 1 sq. ft. of heating surface than it will if we put it into the boiler and allow it first to mingle with and be warmed by the large body of hot water there present. Obviously, the feed water should be heated in a vessel separate from the boiler and receiving gases of combustion after they have passed through the boiler. This is the correct application of the counter-current principle to boiler practice.

The Economizer

The problem of devising an efficient apparatus for this purpose was first taken up by Edward Green, of England, in 1845. After experimenting with a great many types of apparatus and with different arrangements and kinds of tubes, he finally settled upon an arrangement substantially identical with that now in general use. This apparatus, well named by its inventor, the Economizer, consists of a stack of vertical cast iron tubes, each about 4⅝ inches in diameter and 9 feet long, pressed into top and bottom headers to form sections of the desired number of pipes, which sections are in turn placed side by side to form an economizer of any desired length and capacity. Ordinarily, the water is introduced to the bottom headers by a branch pipe running along one side of the economizer and the hot water is taken from the top headers by another branch pipe running along the diagonally opposite corner of the assembled economizer. The amount of economizer surface that should be installed in any given case can only be determined after a careful consideration of many factors, including the amount of fuel burned, the size and type of the boilers, cost of the coal, load-factor, etc. A general practice is to install half as much economizer surface as boiler surface, but where the boiler surface is driven considerably above the ordinary commercial rating, this would be too little.

The size of economizer required to effect a given result, may, however, be easily calculated with fair accuracy. Suppose that the temperature of the water entering the economizer from the hot-well of the condenser is 105 deg. F., and that the final temperature desired is 260 deg. F., or a total rise of 145 deg. F. Suppose, further, that the temperature of the gases leaving the boiler is 600 deg. F. Now say that 10 lbs. of water are evaporated per lb. of coal burned

* General Manager, the Green Fuel Economizer Co.

and that 20 lbs. of gases are discharged for each pound of coal, giving 2 lbs. of gas per lb. of water. Assuming the specific heat of the gases to be .23, it will be seen that for each degree rise of the temperature of the feed water, the gases will be cooled off a little more than 2 deg. F., so that the total fall in temperature of the gases will be $2 \times 155 = 310$ deg. 600 deg. — 310 deg. = 290 deg. F. is, then, the final temperature of the gases leaving the economizer. Now a boiler horse-power is represented roughly by the evaporation of 30 lbs. of water per hour. To heat 30 lbs. of water through 155 degs. will require 4650 heat units, so we must install enough economizer surface for each boiler horse power to transmit 155 heat units per hour when the average temperature of the gases is $\frac{600 + 290}{2} = 445$ deg. F. and the average temperature of the water is $\frac{105 + 260}{2} = 182.5$ deg. F., that is, when the average difference between the gases and water is 445 deg. — 182.5 = 262.5 deg.

Extensive experiments have shown that the amount of heat transmitted through an economizer surface per sq. ft. per hour per degree difference of temperature Fahrenheit is from 2½ to 4 British thermal units. Taking 2½ to be on the safe side, we find that in the above case each square foot will transmit $262.5 \times 2.5 = 655$ heat units per hour and to transmit 4650 heat units per hour will require $\frac{4650}{655} = 7$ sq. ft. of economizer surface.

To illustrate the foregoing remarks I will refer to the performance of several economizers installed in well-known plants. Dean and Main, consulting engineers, of Boston, made tests some time ago on the Green fuel economizer installed in the Natick Mills in connection with a B. & W. boiler, having 3,467 sq. ft. of heating surface. During the test a steam pressure of 150 lbs. gauge was carried and 10.216 lbs. of coal were burned during a period of 11¼ hours, converting 94,734 lbs. of water at 40 deg. F. into steam at 150 lbs. pressure gauge. The temperature of the gases leaving the boiler was 416 deg. F., an exceptionally low figure, while the temperature of the water leaving the economizer was 165 deg. F. The conditions here would usually be considered unfavorable for a large showing by the economizer, since the gases leaving the boiler are comparatively low in temperature. By comparing the results obtained with the economizer with an identical test made two days later without the economizer, it was found that the coal saving, as represented by the lbs. of water evaporated per lb. of coal, was nearly 14 per cent., although the difference of the feed temperature would have given only 10.8 per cent. increased evaporation by the common rule of 1 per cent. for each 10 deg. rise. This brings to our attention a fact very often encountered in the comparative economizer tests with and without the economizers, namely, that the actual coal saving is greater than would be computed from the ratio of the heat supplied by the economizer to the total heat required to turn the water into steam. Several explanations of this fact have been attempted, the most likely of which is, that by furnishing part of the heat the economizer diminished the work of the boiler heating surface and the amount of coal that is burned upon the grates, and it is known that boilers and furnaces as ordinarily installed fall off slowly in efficiency when the load is increased beyond a certain amount. By the installation of suitable means of burning efficiently the larger amount of coal upon the grate this relation might be changed, but the fact that the actual coal saving is greater than the theoretical has been frequently noted in tests. Results in other plants are shown in the following table:

Test No.	Boiler surface sq. ft.	Econ. surface sq. ft.	Steam pressure lbs.	Temp. F. flue gases leaving boiler	Temp. F. water entering econ.	Temp. F. water entering boiler	Saving %
1.	3,126	1,920	68.2	435	84.2	196.2	12.5
2.	9,000	11,520	120.3	620	101.	237.	18.3
3.	33,380	98,340	166.	548	96.	200.	9.2
4.	14,000	4,608	150.7	389	103.	202.7	12.4
5.	9,543	4,749	78.2	535	184.5	265.2	

In none of these plants, as will be noted, were the gases from the boilers at a particularly high temperature. When high temperature gases are available, much greater savings can be realized by the economizer, as will be apparent from the results secured in the following plants. At the Daubhill Brickworks, Bolton, the average flue temperature was 650 deg. F. The economizer raised the feed temperature from 52.1 deg. F. to 259.5 deg., thus saving 21 per cent. of the coal. At the works of Dickens and Haywood, Middleton, the temperature of the flue gases was 655.25 deg. and the economizer was able to raise the feed from 59.6 deg. to 301 deg., saving 24.7 per cent. At the mill of A. Scott & Sons, Oldham, the temperature of the flue gases was 721.6 deg., the feed was raised from 50 deg. to 291 deg. and the saving was 26.18 per cent. At the Manchester Union Warehouse, a flue temperature of 675 deg. was found, which made it possible to raise the feed from 113.3 deg. to 282 deg., giving a saving of 20.2 per cent. The economizer in the plant of A. Scott & Sons contains 216 tubes, and as the plant burns over six tons of coal per day of ten hours, the economizer more than pays for itself every year.

It should be pointed out in this connection that modern practice is inevitably in the direction of higher temperature of the gases leaving the boiler. Steam pressures are constantly being carried higher, and as the boiler cannot in any way reduce the temperature of the gases below nor even anywhere near the temperature of the steam, the temperature of the flue gases will rise in consequence. For instance, with a boiler pressure of 200 lbs. gauge the temperature of evaporation is 387.5 deg. F., under which condition the temperature of the gases leaving the boiler will probably be well above 500 deg. F. Where a superheater is employed in connection with the high pressure, a good arrangement is to place the superheater in a by-pass for the gases, thus securing along with a convenient and safe location of the superheater, a low final temperature of the chimney gases and high fuel economy.

So far we have dwelt entirely upon the fuel saving effected by the use of economizers, but there are several minor advantages which should be mentioned. For one thing, it increases the steaming capacity of the boiler, that is, by supplying 10, 15 or 20 per cent. of the heat required to turn the water into steam, it permits the boiler to evaporate that much more water without increasing the virtual rate at which the boiler heating surface is driven. This feature is especially important in plant subject to sudden and very heavy overloads, in which case the boiler is still further aided by the fact that the economizer holds in reserve a large supply of hot water. Where 5 sq. ft. of economizer surface per boiler horse-power are installed, this supply of feed water, heated up nearly to boiler temperature, is sufficient for about an hour's run. The protection given to the boiler in the way of avoidance of straining of seams and rivets through heating the feed water is well recognized, since it is known that if the cold water discharge upon one portion of a boiler shell should reduce its temperature by 170 deg. F., the stresses set up would be in the neighborhood of 30,000 lbs. per sq. in.

Trade Happenings and Opportunities

Woodworking News From Coast to Coast — Projected Plants and Extensions Figure Largely in the Month's Developments

F. J. Gadke, Lakelet, Ont., has sold his saw mill to Wm. Gadke.

A new Vancouver concern is the West Coast Shingle & Mill Company, Limited, capitalized at $15,000.

The Columbia River Saw Mill Company, Kault, B.C., will erect a large modern saw mill at Sicamous next spring.

The ratepayers of Berlin defeated a by-law in favor of granting fixed assessment to the Lippert Furniture Company.

Messrs. Andrews Bros. & Robb, Townshend street, Sydney, N.S., are contemplating the purchase of woodworking machinery.

The Western Canada Saw Mills Yards, Limited, are establishing a branch at Factoria, according to a despatch from Saskatoon.

The sash and door factory of Paul Demers, Montreal, Que., was destroyed by fire last month. The loss was partly covered by insurance.

P. J. Noel has secured a site at Fort Frances, Ont., for a plant for the manufacture of barrel staves and excelsior. The plant will be built in the spring.

The Rumely Products Company has been incorporated at Vancouver, with a capital of $50,000. Their principal business will be to deal in engines, saw mills, etc.

A fire occurred last month at the sash and door factory of S. J. Herber, of Thetford Mines, Que. The loss, which was comparatively light, was partly covered by insurance.

The Armstrong Sash & Door Factory (J. Simington & Company, proprietors), is an industry that is growing larger each year. This firm specialize in wood turning, cabinet making, etc.

C. C. Moir, secretary of the New Ladysmith Lumber Company, Limited, Nanaimo, B.C., for some years, recently resigned that position to engage in the sash and door business in that city.

John Forristal, manager of the London and Petrolia Barrel Company, Simcoe street, London, Ont., will shortly have plans prepared for the erection of a fibre box factory. He will then be in the market for machinery.

A sash and door business, in addition to a general line of logging and lumbering, will be carried on by the newly organized firm of R. C. Patterson Shingle Company, Limited, of Vancouver, incorporated with a capital of $10,000.

The Royal City Sawmill at New Westminster, B.C., which was almost demolished by fire last spring, has now been torn down to make way for C. N. R. extensions. The owners are not thinking of rebuilding at the present time.

Oscar C. Teal, Dufferin street, Bridgeburg, Ont., has commenced the erection of a planing mill on Erie street. The plant will be one storey high, of cement foundation and concrete block construction. Mr. Teal will require equipment for the plant.

The Harriston Furniture Company, Webb street, Harriston, Ont., are considering plans for extending their furniture factory. The proposed addition will be two storeys, 60 ft. x 80 ft., cement, brick and stone, fireproof construction. The company will need new machinery and freight elevators. The manager is H. Leighton, John street, Harriston, Ont.

Alphonse Tessier, Chatham street, Penetanguishene, Ont., will build a planing mill and sash and door factory. The building will be of cement foundation and brick construction. Mr, Tessier will be in the market for machinery.

The Quatsino Timber Company, Limited, is a new Victoria concern that will operate saw and planing mills. The capital is $75,000. Another new company whose head office will be at Victoria is the Macey Office Equipment Company, Limited, capitalized at $25,000.

Good progress is reported at the plant of the Fisher Office Furniture Company, Lindsay, Ont., where extensive improvements have been made. Machinery of the most modern type has been installed. The plant is expected to be in operation about this date.

A recent incorporation at the Federal Capital is that of The Pickerel River Lumber Company, capitalized at $100,000. They will carry on business as timber and lumbermen, saw and planing mill proprietors. The directors include T. A. Beamont and A. H. Armstrong.

Paul Bennewitz, of Stratford, has taken over a part of the Burr funiture factory at Guelph, Ont., and will manufacture "musical" furniture, such as piano stools and benches, gramaphone cabinets, etc. Machinery has been installed and the plant will be in operation at an early date.

The sawmill of the Western Canada Timber Company, Limited, at Gerrard, was closed down November 15th, when the last log in the boom was put on the carriage. The planing mill will be open all winter and a larger force than usual will be employed taking out logs for next season's use.

The Moresby Island Development Company, Limited, of New Westminster, capitalized at $250,000, has been incorporated with a wide variety of objects, ranging from the business of fishermen and cannery proprietors to the operation of electric light systems and the equipment and running of sawmills, etc.

The Great West Lumber Company, of Red Deer, Alta., will make material additions to their mill during the winter. The new machinery will include a new lath-mill, a resaw, a new boiler and additional power. The company has now 180 men in the woods. They expect to start their plant earlier than usual this spring.

The Pacific Box Company, Limited, Vancouver, whose property expropriated for Great Northern Railway purposes, has erected a new plant of much larger capacity on the tide flats at the north end of Connaught bridge across False Creek. Manager Sharpe hopes to have his staff at work in the new factory by the first of the year.

When their lease of the Queen City Planing Mills, Queen street west, Toronto, expired a few months ago, Messrs. Madden Brothers, who carry on a general contracting and building business, removed to West Adelaide street, where they have good yard space and workshop but no machinery. "This is a handicap," said one of the firm to the Woodworker man, "and we are contemplating putting in a few woodworking machines to take care of

some, at least, of the mill-work required on our various contracts. The mills are all busy just now and likely to be so for some time to come, and a few machines will help us wonderfully." It is just possible that motor drives will be used.

The Elmira Furniture Company, Union street, Elmira, Ont., will build an addition to their furniture factory. It will be three storeys, 100 ft. x 50 ft. The ratepayers of Elmira recently passed a by-law for a loan of $10,000 to the company. The president of the company is Mr. Thos. Dillon, and the manager is Mr. A. Steinke.

Among the new companies we note the Canada Lumber Sales Company, Limited, incorporated with a capital stock of $60,000. The new concern will carry on a general lumbering, saw, planing mill and manufacturing business. The incorporators include Mr. A. P. Beaupre, J. H. Poulin, A. Ste. Marie, O. Berthiaume and V. Martineau.

The mill of the Saw Mills Owners Sales Company, Limited, at Belladune, N.B., has been burned out. It was a new winter mill, which had just been completed, and was fully equipped, including electric light. Preparations had been made for cutting ten million feet of lumber, in fact a small quantity had been cut. The hands were all away on a holiday, excepting the watchman, and the cause of the fire is unknown. There was no insurance on the mill. Arrangements have been made for immediate re-building.

Collins Company Open Office at New Westminster, B. C.

The Collins Lumber Company, manufacturers and wholesalers, recently opened an office at New Westminster, B.C., in order to get into closer touch with the trade, their mills and factory being located at Beaver River, in the Fraser Valley. The sawmill has circular rig equipment, the capacity being 30,000 feet per ten hours, while the output of the shingle department averages 50,000 per ten hours. The planing mill is equipped with McGregor-Gourlay inside moulder, Berlin sizer and Goldie-McCulloch resaw, while a fast-feed machine for flooring and finish is on order. A second dry kiln is now under construction, so that both lumber and shingles can be made ready for shipment at short notice. The company owns a large area of fir and cedar limits, and log at present with donkey engines, but next spring will have three-quarters of a mile of standard gauge railway in operation, to be gradually increased to two miles to tap the back timber. The rails, locomotive and trucks will be purchased second-hand. L. H. Collins, the president and managing director of the company, takes advantage of this issue of the Western Lumberman to present the firm's initial announcement to the prairie and local trade.

Sawmill Under Construction at False Creek, B. C.

The purchase by the Cedar Cove & Door Company, Limited, of a half interest in the Imperial Shingle Company, Limited, False Creek, B.C., will bring about an amalgamation of the two plants, the Cedar Cove firm removing to False Creek, where the site offers needed room for expansion. Piles have been driven for the foundation of the new sawmill, which will be located to the east of the shingle mill, but immediately adjoining. The sash and door factory will be erected across the railway track on 6th avenue, where a fine site 50 by 150 feet is available. The Imperial shingle mill was closed down November 1st, the season's cut having been completed, but will start up again February 1st. In the meantime Z. Giberson, part owner is superintending the construction of the sawmill and at the same time is carrying out some improvements in the shingle plant, while T. Gadd, the manager of the Cedar Cove mill and factory, has been making efforts to fill the orders on hand so that he may have a clean sheet when moving day arrives. Most of the equipment in the present mill and factory will be transferred to the new premises.

Piano Industry for Amherst, N. S.

Another large industry is locating in Amherst, N.S. It will be known as The Amherst Pianos Limited. The new concern is headed by J. A. McDonald, of the McDonald Piano Company, Halifax, probably the largest piano dealers in the Maritime Provinces. The factory is expected to be started early in the spring and will employ about two hundred experienced workmen. The output when thoroughly completed will be from two thousand to two thousand five hundred pianos a year. An organization meeting was held recently and the following directors were appointed: J. A. McDonald, Wm. McDonald, Hon. O. T. Daniels, M. F. Clarke, Halifax, and George T. Douglas, Hon. N. Curry, E. N. Rhodes, M.P., and J. E. Lusby, of Amherst.

Ontario Show Case Company to Build Big Factory

The Ontario Show Case Company, of Toronto, who, less than eighteen months ago, more than doubled the capacity of their plant, find it necessary to make even greater extensions. The plans, now ready, show a three-storey building, 50 x 100 feet, to be erected in the rear of the present premises at West Richmond street.

While discussing the plans, Mr. M. Rosus, the head of the company, informed the Woodworker representative that the building would be of the latest style of factory construction. Much attention will be paid to the lighting, heating and ventilating system. Great care will be taken when it comes to the selection of the machinery. "We are going to be very cautious in this matter," said Mr. Rosus, "and you may say that we will install nothing but the best. A great deal will be required and we are already giving the question considerable thought."

It is expected that active construction work will commence about the end of February. It is possible that a new dry kiln will be built at the same time.

Toronto Firm Putting New Ideas into Practice

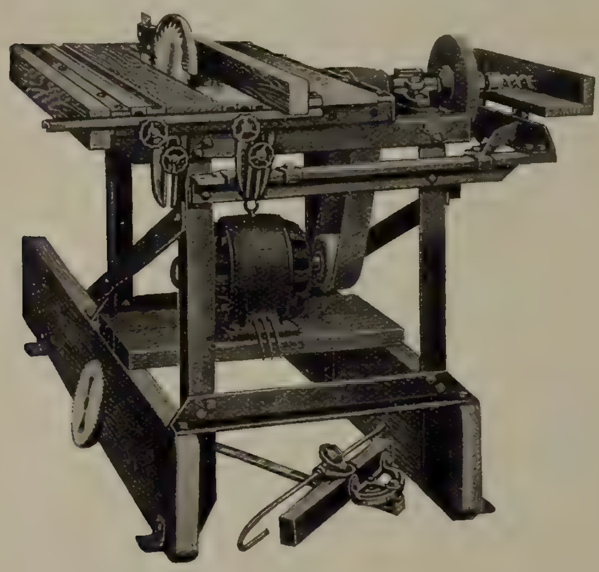
Matthews Bros., Limited, Toronto, who are the second largest picture fram manufacturers in Canada, are building a large addition to the west end of their present building, which will be used as offices, stock and showrooms. When the new building is completed, the packing and shipping room will be extended and will take up the floor space now used by the office staff. At the present time the firm are installing fire sprinklers throughout the entire plant.

"Is it your intention," the Woodworker man asked Mr. Fred Matthews, "to put in new machinery " "Not just now," he said, "but if our business continues to grow we may find it necessary to do so." At this stage of the conversation Mr. Matthews had something really interesting to say. It appears that two years ago this firm put in two or more fast-feed machines which turned out the work so rapidly that it was found necessary to build the new addition. The heads of the firm are planning a new arrangement of their machinery with a view to saving time in trucking stock from one machine to another and to and from the different departments. "We intend," said Mr. Matthews, "to put into practice some new methods that are engaging our attention. We are going to cuot out lost motion and save our men as many steps each day as we can." The scheme is a good one and might be emulated to advantage

by others engaged in the various branches of the woodworking industry.

Motor Driven Circular Saw

The accompanying illustration shows a remarkably serviceable combination woodworking machine made by the Parks Ball Bearing Machine Company of Cincinnati, Ohio. This machine is driven by a 3-horse-power, 60-cycle, 220-volt alternating-current Westinghouse induction motor. The machine may be used as a circular saw and also as a boring machine by means of an attachment. It is made in two sizes, light and heavy, the former suitable for driving by a three inch belt, and the latter by a four inch belt, the belt in each case running over a 3-inch pulley operating a saw 14 inches in diameter for ripping hard lumber. The frame is made of heavy angle steel, strongly braced, with overlapping corners securely belted together. A long substantial wooden base, one on each side, greatly increases the steadiness of the machine, giving more foundation and distributing the strain over the floor area. Angle steel clips are provided on the timbers for holding the machine to the floor. A saw table is made of angle and channel steel ground to a uniformly level and true surface. The angle steel side table affords a substantial support, on which to bolt wood extensions of any width or length for work. The table is hinged at the back and so as to permit its being lowered or raised. It is provided with an adjustable depth cut having an opening for a 14-inch saw that will cut five inches deep. The machine can also be supplied with a boring attachment which can be used for routing, mortising and turning rosettes. This consists of an adjustable sliding sup-



port to hold the material being bored and a chuck attached to the end of the sa wmandrel. Holes are provided in the frame for this attachment which can easily be added after the saw has been installed.

The machines are designed for electric drive by motors of from 3 to 4 horse-power capacity. The motor is mounted on the floor and belted to the pulley on the shaft which is mounted on the base timbers. The motor shown in the illustration, herewith, is of the alternating current type, with what is known as a squirrel cage rotor or revolving part. This type is particularly adapted to use in woodworking plants because of the absence of moving contacts and the entire elimination of any danger of fire from sparking. The motor requires absolutely no attendance, beyond an occasional oiling, and may be started and stopped from any point that is convenient to the operator.

British Columbia Now Has Largest Sawmill in the World

Improvements on an extensive scale are being made at the plant of The Canadian Western Lumber Company at Fraser Mills, B.C. With the installation of the machinery completed, a million feet will be the record of the combined plant for a ten-hour shift and the daily output of the plant will be close to a million feet per day. While the Fraser mill at present has the record of turning out on one floor the greatest board measure of any mill in the world, this new addition will make the mill's general daily output greatly in excess of any other plant in the world.

At the present time a total of 750,000 feet is the daily output and the number of employees 1130, but when the new plant is in shape in April 500 more employees will be added.

The new cedar mill buildings have been completed and the machinery is now being installed. This will give a capacity of 250,000 shingles each ten-hour shift.

In addition to the present plant seven new dry kilns have been erected, making three more for shingles and four for lumber, and giving the plant seventeen in all.

Besides this a mammoth storage shed, a veneer factory 100 by 120 feet, a sash and door factory, 100 by 300 feet, with a shed 100 by 200 feet, will also be installed.

The new plant will be electrically driven, and with the exception of the turbine engine installed in the new plant of the British-Canadian Lumber Company at Queensborough, this machine will be the largest in any mill on the American continent.

The Port Blakely mills on Puget Sound will now have to take second place among mills, and to British Columbia will fall the title of the largest sawmill in the world.

Norwood, Man., the Home of a Well-Equipped Sash and Door Factory

The Acme Sash and Door factory on Rue Des Meuron in Norwood, Man., is completed, and is now in active operation. It has been equipped with entirely new and modern machinery and is said to be one of the best of its kind in western Canada. About thirty men are already on the payroll, while as soon as the building season opens up it is anticipated that the number will be increased to about seventy. Stock sizes of sash, doors and window frames are manufactured, and the company have also equipped the plant to handle special mill work. The size of the present building is 107 by 72 feet, two storys and of mill construction. It has been erected with heavy timbers so arranged that a third storey can be added at any time with very little reconstruction.

The company is entirely a local one, the officers being: T. D. Robinson, president; F. Hinds, vice-president; A. T. Wilson, managing director; E. M. Counsell, treasurer; and directors, W. B. Alsip, A. B. Anderson, G. W. Ford, John Sutherland and W. W. Cross.

LINDERMAN

AUTOMATIC DOVETAIL GLUE JOINTER

Found $5300.00

waste in cutting up, jointing and glueing departments

A General Manager and the Superintendent of a prominent Canadian Furniture Concern last April figured that they were losing $5300.00 that could be saved should they install a Linderman Dovetailer, and at the April meeting of their Board of Directors submitted figures showing where the loss occurred.

In December, after having the machine in operation over six months, the General Manager brought out the same estimate sheet that was submitted to the Board of Directors six months previous and proved from his cost figures that his estimate had been correct.

In the six months just ended their figures showed that they had consumed:—

3500 lbs. of glue less than during the previous six months.

Five men had been taken from the ripping, jointing and glueing departments and sent into other parts of the factory.

Over 50,000 feet of lumber had been saved.

These figures were given to us voluntarily as an actual fact, and the General Manager then stated "We expect next year to build a factory to double our output, when we will install a second machine."

One week previous to this conversation, the General Manager of another furniture factory, who had had a Linderman machine in operation since August stated that his cost figures showed he was making a saving of at least $10.00 each working day; that they would save at least 75,000 feet of lumber a year; the labor of three men, and fully sixty per cent. of their glue bills.

Besides the actual money saving there is a further saving which cannot be estimated in dollars and cents. What would be your output loss if you had to sand every piece by hand instead of by machinery? What is your gain in output by being able to glue up practically every piece by machinery instead of by hand, and to know that at the end of each day's run practically all the stock that has been cut up has been glued and is ready to move on the next morning through the machine departments?

May we not be permitted to investigate your conditions and tell you approximately what we can save for you?

Canadian Linderman Co., Ltd.

—— Works at ——

Muskegon, Mich. Woodstock, Ont.

Canada's Great Building Record of 1912

Thirty-Seven Cities and Towns Rolled up a Total of Nearly One Hundred and Eighty-Six Million Dollars

THE building expenditure of thirty-seven of the principal cities and towns of the Dominion for 1912 reached the large sum of $185,898,535, this representing a proportionate increase of 41 per cent. over the corresponding returns for 1911. Toronto heads the list with a total of $27,401,761. The higest percentages of increase among the cities are held by Edmonton (293), Victoria (104), Medicine Hat (282), Maisonneuve (125), and Port Arthur (319).

In comparing the returns with those of 1911, it is interesting to note the changes that have taken place in the positions of the "runners-up." Toronto's supremacy is likely to remain unchallenged for some years, and so the first position is established, but there is not the same stability attached to the second, third, fourth and fifth positions in the roll of honor. Last year, Vancouver, which occupied second place in the 1911 returns, dropped from second to fifth place. Winnipeg improved her position a point. Calgary, with an expenditure of over twenty millions and a percentage of increase of 58, jumped from fifth place to third.

There are many noteworthy features in connection with the returns. Of these perhaps the most outstanding is the almost entire absense of losses. In the whole list of thirty-seven cities, decreases are recorded in only two, namely, Westmount and Guelph.

It is significant to the woodworking industry that residential work figured largely in the classification of all the larger cities. In Toronto, out of a total of twenty-seven millions nearly sixteen millions came under the head of Dwellings and Apartments.

Further comment upon these returns is made editorially in this issue.

City or Town	Dec. 1912	Dec. 1911	12 mos. 1912	12 mos. 1911	Increase per cent
Toronto	$1,936,685	$1,791,032	$27,401,761	$24,374,539	12
Winnipeg	469,450	206,350	20,475,350	17,716,750	16
Calgary	1,033,560	698,160	20,394,220	12,907,638	58
Montreal	684,675	622,422	19,641,955	14,579,952	35
Vancouver	1,530,365	1,592,465	19,428,432	17,652,642	10
Edmonton	680,532	74,735	14,446,819	3,672,260	293
Victoria	742,855	242,350	8,208,155	4,026,315	104
Regina	2,209,675	71,230	8,047,309	5,099,340	58
Saskatoon	82,125	134,125	7,640,530	4,960,286	54
Hamilton	231,100	92,300	5,491,800	4,255,730	29
Fort William	572,960	589,250	4,211,285	3,077,860	37
Ottawa	199,800	195,060	3,621,850	2,997,610	21
Medicine Hat	70,480	17,905	2,836,239	743,272	282
Maisonneuve	82,900	55,150	2,685,828	1,195,120	125
Port Arthur			2,494,179	595,180	319
Westmount	82,100	36,160	1,824,369	1,974,670	8*
New Westminster	55,150	60,900	1,634,528	1,124,587	45
Outremont			1,582,000	1,317,700	20
Lethbridge	69,805	102,740	1,358,250	1,033,380	31
St. Boniface	8,400	102,550	1,251,012	1,131,735	11
Brantford			1,167,105	623,860	90
Brandon	27,700	1,925	1,166,214	1,024,529	14
London	27,263	187,553	1,136,108	1,036,880	10
Windsor	80,000	81,150	1,098,063	739,515	48
Berlin	5,195	7,795	842,613	358,095	135
St. Catharines			811,335	265,435	206
Sydney	4,840	9,000	656,111	495,642	32
Kingston	10,465	3,311	645,774	314,569	105
Halifax	38,350	98,000	579,775	508,836	14
Galt	21,115	103	506,130	282,334	79
Welland			469,774	342,808	37
Peterboro	10,010	4,115	466,905	345,372	35
Guelph			388,499	513,690	24*
Stratford	7,000	125	367,233	103,523	255
Preston			337,160	244,375	38
Owen Sound			310,000	189,000	64
Nelson	3,400	6,650	273,865	166,700	64
	$10,977,955	$7,084,611	185,898,535	31,981,729	

Proportionate increase on totals for above cities, 41 per cent.

*Decrease

BUYER'S DIRECTORY

AUTOMATIC DOVETAIL GLUE JOINTER
Canadian Linderman Machine Co., Ltd., Woodstock, Ont.

AUTOMATIC GLUE CLAMP CARRIER
Nels J. Billstrom, 1315 Tenth street, Rockford, Ill.

BABBITT METALS
Shurly Dietrich Co., Ltd., Galt, Ont.
Fay & Egan Co., Cincinnati, O.
Canada Metal Co., Ltd., Toronto.

BALUSTER LATHES
C. Mattison Machine Works, Beliot, Wis.
Thos. White & Sons, Paisley, Scotland.
Chicago Machinery Exchange, Chicago, Ill.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.
Canada Machinery Corp., Ltd., Galt, Ont.

BAND SAW FILING MACHINERY
Shurly Dietrich Co., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

BAND SAWS
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Shurly Dietrich Co., Ltd., Galt, Ont.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
R. H. Smith Co., Ltd., St. Catharines, Ont.

BAND SAW MACHINERY
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
H. W. Petrie, Ltd., Toronto.

BAND SAW MILLS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., Cincinnati, Ohio.

BAND SAW STRETCHERS
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

BENDING MACHINES
Fay & Egan Co., Cincinnati, Ohio.

BELTING
J. A. Fay & Egan Co., Cincinnati, Ohio.
Sadler & Haworth, Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
H. W. Petrie, Ltd., Toronto.

BELTS (Endless)
Candada Machinery Agency, Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Sadler & Haworth, Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
H. W. Petrie, Ltd., Toronto.

BELT CEMENT
Sadler & Haworth, Montreal.

BELT FASTENERS
Sadler & Haworth, Montreal.

BELT DRESSING
Sadler & Haworth, Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

BLOWERS
Sheldons Limited, Galt, Ont.
H. W. Petrie, Ltd., Toronto.

BLOW PIPING
Sheldons Limited, Galt, Ont.

BOILERS
Canada Machinery Agency, Montreal.
H. W. Petrie, Limited, Toronto.

BORING MACHINES
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Mussens, Limited, Montreal.
J. M. Nash, Milwaukee, Wis.
Valley City Machine Works, Grand Rapids. Mich.
H. W. Petrie, Limited, Toronto.

BOX MAKERS' MACHINERY
Canadian Linderman Co., Ltd.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.

BROKEN CASTINGS BRAZED—MACHINIST AND DIE MAKER
W. H. Dunne, 1492 Queen St. West, Toronto.

CABINET PLANERS
Canada Machinery Corporation, Ltd., Galt, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Agency, Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Valley City Machine Works, Grand Rapids, Mich.
Baxter D. Whitney & Son, Wichendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Ltd., Toronto.

CARS (transfer)
Sheldons Limited, Galt, Ont.

CARVING MACHINES
Canada Machinery Corporation, Ltd., Galt, Ont.
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Hespeler Machinery Co., Ltd., Hespeler, Ont.
Valley City Machine Works, Grand Rapids, Mich.

CHISELS
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

CIRCULAR SAW MILLS
Canada Machinery Agency, Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
H. W. Petrie, Limited, Toronto

CHAINS (Silent)
Jones & Glassco, Montreal

CLAMPS (Chain, Carpenter, Cabinet, Pattern Makers, Bench, Mitre, Piling, Mounted and Rotary Wheel)
Black Bros. Machinery Co., Mindota, Ill.
J. A. Fay & Egan Co., Cincinnati, Ont.

CLAMPS (Saw)
Shurly Dietrich Co., Ltd., Galt, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

CLUTCHES
J. A. Fay & Egan Co., Cincinnati, Ohio.

COLUMN CLAMPS
Black Bros. Machinery Co., Mendota, Ill.

COLUMN MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.

CORE BOX MACHINES
J. A. Fay & Egan Co., Cincinnati, Ohio.
Chicago Machinery Exchange, Chicago, Ill.
E. & B. Holmes Machinery Co., Buffalo, N.Y.

CUT-OFF SAWS
Canada Machinery Corporation Ltd., Galt, Ont.
Shurly Dietrich Co., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Berlin Machine Works, Ltd., Hamilton, Ont.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

CUTTER HEADS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Samuel J. Shimer & Sons, Milton, Pa.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

DADO HEADS
C. Mattison Machine Works, Beloit, Wis.
W. A. Elliott, Bathurst and College Sts., Toronto.

DIEMAKERS & MACHINISTS
W. H. Dunne, 1492 Queen St. West, Toronto.

DISK GRINDERS
J. A. Fay & Egan Co., Cincinnati, Ohio.

DOGS (Saw Mill)
J. A. Fay & Egan Co., Cincinnati, Ohio.

DOVETAILING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canadian Linderman Machine Co., Ltd., Woodstock, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

DOWEL MACHINES
Thos. White & Sons, Paisley, Scotland.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J .A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Valley City Machine Works, Grand Rapids, Mich.

DRYING MACHINERY
Sheldons Limited, Galt, Ont.
Morton Dry Kiln Co., Chicago, Ill.

DRY KILNS
Sheldons Limited, Galt, Ont.
Morton Dry Kiln Company, Chicago, Ill.

DUST COLLECTORS
Sheldons Limited, Galt, Ont.

DUST SEPARATORS
Sheldons, Limited, Galt, Ont.

EDGERS (Gang)
Berlin Machinery Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

EDGERS (Single Saw)
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Agency, Montreal.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

END MATCHING MACHINE
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

ENGINES (Steam)
H. W. Petrie, Limited, Toronto.

EXHAUST FANS
Sheldons, Limited, Galt, Ont.

FLOORING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corporation, Ltd., Galt, Ont.
Baxter D. Whitney & Son, Winchendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

FLINT
Wausau Quartz Co., Wausau.

FLUTING HEADS
J. A. Fay & Egan Co., Cincinnati, Ohio.

GAINING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Canada Machinery Corporation, Ltd., Galt, Ont.
H. W. Petrie, Limited, Toronto.

GAS ENGINES
H. W. Petrie, Limited, Toronto.

GAUGES (Saw)
Shurly Dietrich Co., Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

GLUE CLAMPS
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.

GLUE HEATERS
J. A. Fay & Egan Co., Cincinnati, Ohio.

GLUE JOINTERS
Canada Machinery Corporation, Ltd., Galt, Ont.
Canadian Linderman Company, Limited, Woodstock, Ont.
Chicago Machinery Exchange, Chicago, Ill.

GLUE SPREADERS
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

GRINDERS (Cutter)
J. A. Fay & Egan Co., Cincinnati, Ohio.

GRINDERS (Knife, etc.)
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

GRINDERS (Tool)
J. A. Fay & Egan Co., Cincinnati, Ohio.
Valley City Machine Works, Grand Rapids, Mich.

GROOVING HEADS
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Samuel J. Shimer & Sons, Milton, Pa.
Canada Machinery Corporation, Ltd., Galt, Ont.

HAND PROTECTORS
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Jones Safety Device Co., Hamilton, Ont.

HAND SCREWS
Black Bros. Machinery Co., Mendota, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

HEATING APPARATUS
Sheldons, Limited, Galt, Ont.

HANDLE AND SPOKE MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
J. M. Nash, Milwaukee, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.

HUB MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

HYDRAULIC VENEER PRESSES
Wm. R. Perrin & Co., Ltd., Toronto.

INJECTORS
H. W. Petrie, Limited, Toronto.

JOINTERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canadian Linderman Co., Ltd., Woodstock, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Plessisville Foundry, Plessisville, Que.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

KNIVES (Planers and Others)
Shurly Dietrich Co., Ltd., Galt, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Samuel J. Shimer & Sons, Milton, Pa.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
H. W. Petrie, Limited, Toronto.

LACE LEATHER
Sadler & Haworth, Montreal.

LATHES (Pattern Makers')
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Valley City Machine Works, Grand Rapids, Mich.
H. W. Petrie, Limited, Toronto.
Thos. White & Sons, Paisley, Scotland.

LATHES (Turning)
Berlin Machine Works, Lid., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Valley City Machine Works, Grand Rapids, Mich.
Baxter D. Whitney & Son, Winchendon, Mass.
H. W. Petrie, Limited, Toronto.

LOOSE PULLEYS
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corporation, Ltd., Galt, Ont.

LUBRICANTS AND GREASES
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.

LUMBER
Elgie & Jarvis, Toronto.

MITRE MACHINES
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N. Y.
H. W. Petrie, Limited, Toronto.

MITRE SAWS
Shurly Dietrich Co., Ltd., Galt, Ont.
E. C. Atkins & Co., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corporation, Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

MITRE CLAMPS
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.

MORTISING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Jones & Glassco, Montreal.
Valley City Machine Works, Grand Rapids, Mich.
H. W. Petrie, Limited, Toronto.

MOTORS
J. A. Fay & Egan Co., Cincinnati, Ohio.

MULTIPLE BOXING MACHINES
J. A. Fay & Egan Co., Cincinnati, Ohio.
J. M. Nash, Milwaukee, Wis.

PATTERN SHOP MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

PICTURE FRAME MACHINERY
Black Bros. Machinery Co., Mendota, Ill.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.

PLANES
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corp., Ltd., Galt, Ont.

PLANERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

PLANING MILL MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Chicago Machinery Exchange, Chicago, Ill.
C. Mattison Machine Works, Beloit, Wis.
Samuel J. Shimer & Sons, Milton, Pa.
Baxter D. Whitney & Son, Winchendon, Mass.
Black Bros. Machinery Co., Mendota, Ill.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie Co., Ltd., Toronto.

PULLEYS
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

RESAWS
Shurly Dietrich Co., Ltd., Galt, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

RESAWS
H. W. Petrie, Limited, Toronto.

RIM AND FELLOE MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corp., Ltd., Galt, Ont.

RIP SAWING MACHINES
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Canada Machinery Corp., Ltd., Galt, Ont.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

SAFETY GUARDS (For Band Saw Machines, Jointers, Rip Sawing Machines, Shapers, Swing Saws, etc.)
Chicago Machinery Exchange, Chicago, Ill.
Fair Manufacturing Company, Racine, Wis.
Jones Safety Device Co., Hamilton, Ont.

SANDERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
J. M. Nash, Milwaukee, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Fisher Sander Co., Berlin, Ont.
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.
Elliot Woodworker Co., Toronto.

SANDPAPER
Black Bros. Machinery Co., Mendota, Ill.

SANDERS (Moulding, Belt and Panel)
Black Bros. Machinery Co., Mendota, Ill.
Chicago Machinery Exchange, Chicago, Ill.
H. W. Petrie, Ltd., Toronto.

SASH, DOOR INTERIOR TRIM AND COLUMNS
M. Brennan & Sons, Hamilton, Ont.

SASH, DOOR AND BLIND MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Samuel J. Shimer & Sons, Milton, Pa.
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.

SAWS (Hand)
Shurly Dietrich Co., Ltd., Galt, Ont.
E. C. Atkins & Co., Hamilton, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

SAW MILL MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
H. W. Petrie, Limited, Toronto.

SAW SWAGES, AUTOMATIC FILERS
E. C. Atkins & Co., Hamilton, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.

SAW TABLES
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

SCRAPING MACHINES
Baxter D. Whitney & Son, Winchendon, Mass.
Chicago Machinery Exchange, Chicago, Ill.

SCROLL SAWS
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Shurly Dietrich Co., Ltd., Galt, Ont.
E. C. Atkins & Co., Hamilton, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.

SECOND HAND MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
H. W. Petrie, Limited, Toronto.

SHAPERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Samuel J. Shimer & Sons, Milton, Pa.
Baxter D. Whitney & Son, Winchendon, Mass.
H. W. Petrie, Limited, Toronto.

SHAVING COLLECTORS
Sheldons, Limited, Galt, Ont.

SINGLE SPINDLE BOXING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.

STAVE SAWING MACHINE
Baxter D. Whitney & Son, Winchendon, Mass.

STORE FIXTURES, FITTINGS
Reflector & Hardware Specialty Mfg. Co. Chicago, Ill.

SURFACERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.
Chicago Machinery Exchangefi, Chicago, Ill.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

SWING SAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

TABLE LEG LATHES
Berlin Machine Works, Ltd., Hamilton ,Ont.
Chicago Machinery Exchange, Chicago, Ill.
Thos. White & Sons, Paisley, Scotland.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.

TENONING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
H. W. Petrie, Limited, Toronto.

TOOLS (Hand)
J. A. Fay & Egan Co., Cincinnati, Ohio.
Samuel J. Shimer & Sons, Milton, Pa.

TRIMMERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

TRUCKS
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Sheldons, Limited, Galt, Ont.

TURNING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.
H. W. Petrie, Limited, Toronto.

UNDER-CUT SELF-FEEDING FACE PLANER
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.

GUMMERS, ETC.
E. C. Atkins & Co., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

UNIVERSAL WOODWORKER PLANER
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
W. A. Elliot, Bathurst St., Toronto, Ont.
H. W. Petrie, Limited, Toronto.

VENTILATING APPARATUS
Sheldons, Limited, Galt, Ont.

VENEER DIERS
Sheldons, Limited, Galt, Ont.

VENEER PRESSES (Hand and Power)
Hydraulic Press Mfg. Co., Mount Gilead, Ohio.
Black Bros. Machinery Co., Mendota, Ill.
William R. Perrin & Company, Toronto, Ont.

VISES (Band Saws)
Shurly Dietrich Co., Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
H. W. Petrie, Limited, Toronto.

VISES (Pattern Makers')
J. A. Fay & Egan Co., Cincinnati, Ohio.

VISES (Circular Saws)
E. C. Atkins Co., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
H. W. Petrie, Limited, Toronto.

WAGON AND CARRIAGE MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.

WINDOW FRAME MACHINERY
Smith & Phillips Mfg. Co., Chicago, Ill.

WOOD PULLEYS
Canada Machinery Agency, Montreal.

WORK BENCHES
Canada Machinery Agency, Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.

Volume Thirteen TORONTO, FEBRUARY, 1913 Number Two

Canadian Woodworker

WHATEVER excellence you strive to obtain in your product is done at a cost, and the cost question is up to you to settle down to the lowest point without impairing your product.

Take the big variety of work a shaper can do, the numerous patterns, rounding up edges, moulding the edges, turning corners, working with the grain and across the grain—some of it an ordinarily made machine can do in a fair way, but to do all of it as it ought to be done—brought up to a finishing smoothness, it takes the best machine to acccomplish it. Such a machine is

The Whitney Two Spindle Shaper,

made in three sizes for medium, light and heavy work.

A few words on a postal from you to us, and we will enlighten you as to the betterness of their construction, the betterness of the work they do, and the better results you will obtain in lowered cost by installing a Whitney. If you don't believe it send the postal.

Baxter D. Whitney & Son

WINCHENDON, MASS.

PACIFIC COAST SALES DEPARTMENT:
H. H. Plummer, Man., Pacific Bldg., Seattle, Wash.

SELLING REPRESENTATIVES:
Henry Kelly & Co., 26 Pall Mall, Manchester, Eng.

Canadian Woodworker

Canada's Only Woodworking Paper

Published in the interests of Planing Mills, Saw Mills, Furniture and Piano Factories, Implement and Carriage Works, Boxmakers and Coopers, Carpenters and Builders.

The Circulation extends from the Atlantic to the Pacific and covers thoroughly all classes of Woodworkers in this immense territory.

Wooodworker Publishing Co., Limited

Nicholls Building Toronto, Canada

United States: E. J. MACINTYRE, 4057 Perry St., Chicago.

SUBSCRIPTION RATE.

Canada, United States, $1.00; Great Britain, Australia 4s 6d.; other countries $1.50 per year. Advertising rates on request.

Vol. 13 February, 1913 No. 2

A Brief Survey of the Lumber Trade of 1912 in its Relation to 1913

IT is an easier matter to look back than to look forward, at least it is so in regard to trade developments. Certainly it is easy enough to look back over the things that happened in 1912. It is an altogether different matter to try and foretell the conditions of 1913. At best, however well a man may be informed, there is an element of chance in it, and as an average performance it is guess-work.

The operations in the woods during the season of 1911 and 1912 proved favorable and large quantities of logs were taken out. Everything in connection with the lumber production looked well and it was anticipater that there would be a supply adequate to the year's demands. This prospect, however, did not materialize. In the earlier part of the year, the demand for hemlock, spruce and the coarser grades of pine was such that it soon became evident that the dry stock was insufficient and prices strengthened accordingly. Buyers then began to place their orders ahead at greatly advanced figures and the feeling that there was a real shortage took hold in earnest. At the beginning of the sawing season the demand was so great and stocks were so low that some users of coarse pine were willing to take what they could get, even to lumber loaded direct from the saw. The men who felt this particularly were those who refused to buy at the higher prices and allowed their stocks to run down lower and lower so that when orders came in they had to take material which under ordinary conditions they would not look at. To-day prices paid for the lines mentioned are the highest in the history of the lumber trade, but other grades of pine, such as common and dressing, have advanced but slightly. It is expected that these grades will increase in keeping with the lower grades. In trying to gauge the tendency of 1913 one cannot believe that there could be any considerable increase in prices. For this reason it is hoped that good judgment will be exercised so that the work into which such large quantities of the lower grades enter may not be held up.

It may not be generally known that last year the producer of lumber did not always get the full benefit of the higher prices. In cases the product was sold early in the year at a figure which later turned out to be only a slight advance, comparatively, over the prices of 1911. Albeit, the prices asked then were quite as high and in some cases higher than buyers were prepared to pay, so that those who did not dispose of their stocks in the early part of the season benefited greatly by holding, while earlier purchasers reaped good profits.

So far, the weather conditions this year have not been at all favorable to bush work and it is to be hoped that a change for the better will come about shortly so that the excellent prospects for 1913 will not be offset by unsatisfactory operations in the woods.

Berlin Exhibition a Stimulus

AT the Berlin and Waterloo Furniture Exhibition there was ample evidence of Canadian skill and enterprise in producing the very best in all classes of furniture. There was conclusive proof that the leading manufacturers in this country are equal to the most exacting demands for fine work. This was the second exhibition of its kind held and gratifying progress was shown. Berlin is to be congratulated upon putting forward a movement to establish a permanent exhibition there. If this movement crystallizes into the erection of a Furniture Building and the holding of annual or semi-annual exhibits, it will be an excellent thing for the trade. The furniture manufacturers should certainly give this some consideration. Exhibitions of the kind promote a friendly spirit of rivalry and make for progress. The manufacturer needs not only to know every detail of what he is doing himself, but also to have a good idea of the strong points of the other fellow's make. Exhibitions such as that held at Berlin serve a variety of useful purposes.

Be Proud of Your Business

IT is surprising how much taking a pride in your business will help you toward success. The man who believes in himself and his business with his whole heart enjoys a tremendous advantage over the fellow who is in business merely to make a living.

Be proud of your calling; so proud that you are determined to make a name for yourself in the community, so that you will be glad to have your son enter it and continue it after you. Family pride and business pride are often closely linked together. It is conspicuous in those men who have achieved a great business success.

Men are frequently heard finding fault with their particular business, deeming themselves unfortunate because fastened to it by the necessity of gaining a livelihood. They thus destroy all their efforts in the work and keep shifting from one thing to another until they are finally failures in life.

A man should put his heart into everything he does. There is no profession that has not its peculiar cares and vexations. No man can escape annoyance by changing his business. There is no mercantile business altogether agreeable. Commerce is affected like all other pursuits with trials and unwelcome duties.

It is very unwise for a man to search out the frets and burdens of his calling and give his mind every day to a consideration of them. They are inevitable. Brooding over them only gives them strength. Everyone should adopt his own business and identify it with

pleasant associations. Honor your business. For only in the proportion that you honor it will it honor you.

The Cooperage Trade in 1912

IN Ontario the output was approximately as follows:—For barrel stock—85,100,000 staves, 31,200,000 hoops, 3,860,000 sets of heading; for kegs, 1,500,000 staves, 3,500,000 hoops, and 200,000 sets of heading.

In British Columbia the production of all classes of cooperage was, 8,000,000 staves, no hoops, and 500,000 sets of heading.

For Nova Scotia and New Brunswick statistics are very incomplete. We believe the estimates we give as follows, are considerably below the actual production, on account of a great number of saw mills that make staves and heading as a side line, and do not report their output. As nearly as we can ascertain their output for barrel stock was; 18,000,000 staves, 1,150,000 sets of heading, 1,500,000 hoops; for keg stock, 9,000,000 staves, and 1,000,000 sets of heading. We believe these estimates are very considerably below the actual production.

Prices in the early part of the season were very moderate, and below what could be obtained by putting the bulk of material into lumber. But prices advanced considerably in the latter part of the season, in some lines, almost fifty per cent. This, we believe, will have some effect on the production for 1913, as all manufacturers are cleaned out of stock, and are more likely to stock heavier this winter than last, provided they can contract ahead at prices that will be as good as if the logs and bolts were put into lumber or other products.

Wasted Motions and Energy

WE have had the loss of power in friction figured out for us on pretty fine, hair-splitting lines, and have had demonstrations of the wasted energy in a machine running empty, but have hardly yet touched the subject of the personal energy and motions wasted in handling machinery, and the material being worked on machines. We know that the secret of capacity in a saw mill is to keep the saw in the log as continuously as possible and not have it running idle too much. We often have right here, too, one of the plainest cases of wasted motion and energy.

A sawyer of the rambunctious, rip-snorting kind will run his carriage back from 2 to 4-ft. farther than is necessary, bring it to a sudden stop, and perhaps jerk it back and forth a time or two, manoeuvering for position to turn his log. He works himself and the carriage men hard, and it looks like he is simply tearing the bone out of things, but often he makes less lumber than the quiet man who makes no unnecessary moves of either himself or the carriage, but stops easily at the right place every time, keeps the saw in the log, with but little lost time or motion. and doesn't seem to be rushing things at all.

In the planing mill and factory we have in different form some of the same waste of energy and motion. One man will make a half dozen unnecessary movements in picking up a board and putting it in a machine; another will have the truck containing his material so far from the work that he must take two or three useless steps each time he gets a fresh piece; another will get the stock on the wrong side for convenience in handling. And so it goes; all around us we are wasting personal motions and energy, as well as letting machines run idle and waste power. We have so far given but little specific attention to a study of these with a view to conserving this waste.

There are what we call efficiency experts studying and pointing these things out now, and often reducing them to such hair-splitting extremes that they become so aggravating as to interfere with their usefulness. That is what generally happens when the pencil experts get to work on an idea of this kind; they chase it into so many nooks and corners, and pick up so many picayune points, that they themselves often fall into the same error they are trying to correct, of wasting time and energy. Yet, taken rationally, good work in efficiency can be done by making a study of the wasted energy of unnecessary motions. Study not only your own movements, but also those of the stock you are handling. See how many of them are really productive of actual results, and how many are not. Then see how many of the useless ones can be eliminated by a little thought and practice. It is one of the best places in the world to save a form of waste that has gone too long unnoticed.—Geo. Neal, in The Woodworker.

The Influence of Materials on Design in Woodwork

AN interesting address on the above subject was delivered recently by Mr. F. W. Troup, F.R.I.B.A. After lucidly describing timber houses—those in our own country in what is called "half timber" construction, those in Norway, Switzerland, and other northern countries in pine and, of course, usually "whole timber," i.e., built of solid logs—the lecturer went on to say that when in doubt the designer cannot do better than refer to the old examples in our museums and unrestored buildings, and if you are wise you will take the craftsman into your confidence and you may be able to learn something of him, and at the least you will know what he is equal to, and perhaps find it advisable to modify the designs to suit his capabilities, or better still, leave something for him to modify as the work proceeds. Young architects are told to get to the bench and work with their hands. Now it may seem to them impossible and impracticable to give up the time to acquire even a smattering of half the crafts that go to house-building, but if the young architect does but learn the rudiments of one craft or trade he will find that it gives him an unexpected insight, a kind of instructive knowledge of the others, that will surprise him and reward him for his labor. In designing, above all things avoid being clever merely for the sake of effect. Cleverness is not an art—more often it is mere license and a want of restraint. Be certain of this, that your best work is not that part in it which you most admire yourself, and you will be safe ruthlessly to cut out that part from the design. Choose to be what critics call commonplace, rather than attempt the clever, the smart, the up-to-date. As a last resource, if in doubt, do what you believe to be right, constructively right and true to the nature of your material, and the result will look right, or at any rate it will be the best that you are capable of.

In conclusion, the lecturer said the design is so completely governed by the material that it is really little more than the resultant of two main forces, the inert material with all its possibilities on the one hand,

and on the other the aggressive tools of the craftsman with his infinite capabilities for good or evil—these two forces, the one passive, the other active, brought together by the craftsman and guided partly by his knowledge and experience of what is possible and what is best, and partly by his skill and practice in the use of the tools themselves. These produce the main lines, they affect the assembly or bringing together, the building-up of the whole. That which remains for fancy and imagination to play with is comparatively unimportant. There is indeed a right and a wrong way of letting loose the fancy in carving, painting, or whatever form of gaiety the craftsman allows himself to indulge in, and the right way is always subservient. As soon as indulgence in the fantastic, the tour-de-force or attempt to imitate other materials, begin to get the upper hand, so surely does "debased art" become the true and only description of the work. The theatrical, the inessential, the superficial, rules and leads on to the same end that has been described by a great writer as the vile torrent of the Renaissance.

"Advertise one thing at a time, said the late George P. Rowell, founder of Printer's Ink. Write down all the good things you can think of about that article, then ask yourself 'What kind of people want it?' Now put your story in simple words—the exact words you would use in speaking to those very people if they were in your store. If you have a good picture of the goods, put that in. Repeat all the best things you have set down in your list; others will occur to you as you write them. You will perhaps find that you have too much matter. Now, **condense**, but do not leave out anything essential. Use easy words and short sentences. Put your name and address in big type, and the rest will take care of itself."

Conventions Are Different Now (?)

What is this?

This is the Head-quart-ers of a Con-ven-tion.

But don't they have a meet-ing?

Oh, yes, that is in prog-ress now up stairs some-where.

Do they all at-tend the meet-ing?

Bless your heart, no! No one goes but the of-fi-cers and a few oth-ers that wan-der in by mis-take.

What do they do at the meet-ing?

Oh, they read the min-utes of the last meet-ing, some-one reads a ninety-eight page ar-ti-cle for which no-bod-y gives a "hoot"; some-one else starts an ar-gu-ment and the rest go to sleep; then they wake up, the of-fi-cers re-e-lect themselves, vote the meet-ing the most en-thu-si-ast-ic ever held, and ad-journ.

I think I should like to go to a con-ven-tion.

Of course, we all do.

Section of the Tremblay factory where the lighter mill work is done.

A Pioneer Montreal Woodworking Firm

The Plant and Equipment of Messrs. F. Tremblay & Company

ONE of the oldest established sash, door, and planing mills in Montreal is that of F. Tremblay and Company, William street. Mr. Tremblay, the head of the firm, is a practical man who has worked his way up, and now employs about two hundred people. The mill is admirably situated for shipping facilities, as it adjoins the Lachine Canal, and the company is thereby enabled to get good delivery in the season from the lake boats.

The factory is a comparatively narrow, flat iron shaped building. On the ground floor is situated the offices, kilns, and part of the machinery, while adjoining is an immense lumber yard reaching down to the two canal basins. The firm do a general mill business, but make a specialty of fine interior work, and with the exception of doors, everything is made to order. Contracts for the entire woodwork of every class of building are carried out, and some of it is of a very high order. The bench department is the largest in the factory, and this naturally involves a considerable amount of hand work. In addition to the ordinary contract work, some planing is done for other city lumber yards. The machinery is chiefly of American make, although some of it is Canadian, a portion being supplied by Cowan and Company, Galt, Ontario. Motive power is obtained from a 200 horse-power engine, the boiler room being on the ground floor. The shavings supply the fuel; these are collected by means of fanners, and are conveyed to a vault near the boilers. The firm also generate their own electricity for lighting purposes. There are three kilns, in which steam is used.

The factory is divided, for working purposes, into four sections—one where the lumber is planed, this

Bench department, F. Tremblay & Company, Montreal.

is on the ground floor; a second, where the light work is done and where lumber of 1 in. to 1½ in. is utilized; a third, where the heavy lumber from 2 in. up is handled; and a fourth, the bench department. These are so arranged that the work is carried on by a continuous process, thus economising material and labor. The lumber is carried from the yard to the ground floor, where it is prepared, by means of saws, re-saws, flooring and other planes. After being dressed, it goes to the first floor, where it is cut into various lengths, in two of the departments, depending upon whether it is light or heavy lumber. Much of the machinery in these two departments is identical in character, varying in size according to the class of work for which they are intended. In the section where the lighter class of work is done, there is a sticker machine for small mouldings for doors and slats, several saws, a tenon machine, a shaper, buzz planer, vertical boring machine, slat machine, and an automatic chiselling machine. In the adjoining room the equipment includes an Invincible sand papering machine, which will do a pair of doors at one operation, two other sanders of a smaller type, band and jig saws, rosette machine, wood turning machine, tenon machine for door jambs, grooving machine, chain mortising machines, and hol-

Tremblay factory, Montreal—A department devoted mainly to the heavy work. The scroll work, also, is done here.

low chisel mortising machine. There are also cross cut and other saws for heavy work, and these are chiefly used for cutting lumber for doors. Some of the scroll work done by the band and jig saws is of a very artistic character.

As F. Tremblay & Company do much high class interior finish, the bench room is naturally a very important department, and occupies much space. Here the parts turned out by the machines are put together, and some of it is of more than ordinary quality. A small room is set apart for glueing and veneering, and for the veneer presses. The shipping room is of large proportions, and is near the veneer room.

There is a very ready market for the sawdust, the demand being greater than the supply.

Hard Finish for Soft Wood

Those of our readers who are called upon to give a hard and smooth finish to soft wood are likely to be interested in the following suggestion published in a late issue of the Woodworker and Art Craftsman:

"When only a thin surface is required, a few coats of zinc will make the surface of wood almost as hard as zinc itself. The coating will be a very thin one, and it will yield to light blows on account of the very soft wood underneath the coating of zinc. To give wood a thick and very hard surface, cover it with a paste made up of: Putty powder, 1 lb.; powdered oxalic acid, ½ lb.; and powdeerd gum, 1 oz. Use just enough water to make the paste stiff, then spread upon the wood surface and place aside to harden. If any trouble is experienced in making the coating adhere to the surface of the wood, give the surface a coating of thin glue sizing or mix a small amount with the ingredients while making the paste. The coated surface should be allowed to remain undisturbed for several days until the paste has hardened to a degree which will stand any usage it is likely to get."

An Old-Established Firm of Toronto Woodworkers

Fox and Company, Toronto, were established in 1871 at 426-432 King street west, as manufacturers of sash, doors, blinds, stairs and moulding, and are to-day still carrying on this business at the same location.

Mr. S. Johnson, one of the original founders, still retains an active interest in the firm. Coming to Canada from the United States at the age of fifteen, he has been in the woodworking business ever since that time and is thoroughly conversant with all its branches. His reminiscences of the woodworking business covering such an extended period are very interesting and his statement that "conditions under which woodworkers operate to-day are very different from those of forty years ago" may readily be believed. Mr. Johnson's son, Mr. F. Johnson, is now associated with him in the business. He, like his father, has had a thorough training in his business and has made a special study of the various machines used in woodworking plants.

In addition to the general woodworking business mentioned above, Messrs. Fox and Company make a specialty of cabinets, cutting tables for dry goods, etc., and sample cases. Our representative recently saw a fine pair of Circassian walnut doors which had been manufactured by this firm.

The firm use about three million feet of lumber annually, principally all kinds of hardwoods and pine. They do a considerable retail lumber business.

Some of the machines in use in the factory are:—Fay and Egan band saws; Ballantyne mortiser, circular saw, four-sided sticker, matcher, and surfacer; Goldie panel planer; Gourlay blind machine, sticker; A. R. Williams self-feed rip saw. In addition to the machinery of these well known firms, Fox and Company have invented many ingenious contrivances which they have arranged for their own use.

In 1873 they purchased a 30 h.p. engine, manufactured by Levey & Company, Toronto, and this engine is still in use.

Two steam heated kilns are employed to dry the lumber, and the factory is steam heated throughout. Twenty to thirty men are employed all the year round through the plant.

Fox and Company do quite an extensive business in the towns and cities in the neighborhood of Toronto, and have a siding on the Grand Trunk Railway convenient to their plant.

The Practical Use of Drills and Bits

Testing Drills and Bits at Time of Purchase—Preserving Perfect Shape of Tool as Sent Out by the Maker—Speed, Care of Tools, Size of Spurs, Filing, Clearance and Reboring

SOME may deem it unnecessary for one to go to the trouble of writing an article on the use of drills and bits but where I am I see the necessity daily of instruction in the use of these tools. My own men and others from all over the factory are coming to me frequently for help about keeping the tools in order. I know of one man in a factory near me who has been boring for years on the simplest kind of work and yet cannot sharpen his drills properly. I seriously suspect that after all the experience men have had with drills and bits about one in a thousand is really proficient in their use.

Buying the Drills

What I have to say I will address to the younger generation, hoping that it may help some boy who wants to become skillful in using drills.

First, I would say that in buying these tools test them to see if they are straight. This ought not to be a necessary caution but very lately I bought a ¾-in. drill and it was so crooked I had to discard it. I also have a set of drills from Nos. 1 to 60 and about half of them run badly. The manufacturers of these tools always desire the users of them to report any such troubles as these to themselves, and to apply to the dealers for perfect ones, but this is some bother and expense and it takes time.

I have also had a little unpleasant experience dealing with the retailers or their clerks. They know so little about the fine work sometimes required of the tools and the importance of having them perfect that they do not make very sympathetic friends. They sometimes look quite injured if one insists upon getting exactly the right thing.

If we find any fault they are apt to say, "Well, we never had any complaint before," which, being interpreted, means: "You are the fussiest customer who ever set foot in this store." Not a very encouraging reception is it? But I always get what I go after now.

A drill should run so nicely in the chuck that at a little distance no motion can be perceptible to the eye. Such a drill will begin a hole where it is wanted and finish properly. More about the importance of the straightness of drills will be referred to farther on.

A Perfect Picture of the Tool

When one gets a new drill or bit he should study it carefully and get a perfect idea in his mind of its shape. It took a great deal of study and experiment to evolve our nice bits and drills, and, in the main, if one would attain unto proficiency in their use, he must keep the general shape of them in mind.

So let me impress upon the mind of the young man who desires to become skillful that it is important to study the tools—notice the shape of the different working parts, the angles, clearance, the cutting edges, lips; the spurs, the screw-point, if it is a bit, or the square or diamond point.

If one follows this advice he will know, when there is trouble with a drill, what to do to it. He will not have to experiment—that is, try different things to make it work; he will know the thing needed and do that. There will be no guesswork about it.

I think that there are many somewhat experienced who are not awake to this important matter for many of them have come to me with their bit or drill troubles as though it were almost too much to expect that anyone should know just what was bothering them always. They appear to think a perfect understanding of the tools is beyond the reach of human attainment.

Let no young man begin life with any such idea as that, for if he does he will have to lean on someone else all the way through.

Speed of Drills

The speed of drills and bits for the best work, and the most work, is far too little studied. Most boring machines run too slow and perhaps some are not constructed for running the proper speed.

A grindstone gait may be tolerated in a job shop but in places where men are expected to make thousands of holes, and make them nice, there is a loss of time on slow-speed machines that would shock many manufacturers if they knew what it meant in time, and in quality of work.

My own rule is that for small work, such as brad holes and small screw holes, the machine must work quicker than the operator. If the man must wait for the machine, that is, put the drill down slowly because the machine runs slowly, time is being wasted. I have seen an active young man drill 39,000 holes a day with a No. 57 drill, the speed being 7,500 revolutions per minute. Of course the holes were not deep—probably ½ inch—and they were in soft wood. The same can be done in shallow holes with drills up to ½ inch or over.

Deep holes in the edges of boards, where they are made near together, should be made at the above speed if one regards economy of time and quality of work.

I suppose this rate of speed is considered something unthinkable by men who are used to 2,500 revolutions per minute, but I am moderate in advising it. Reed-board machines run from 9,000 to 10,000 revolutions and for the small work I speak of it is not too high.

Machine and Man

If much depends upon a speed that will allow the operator to sink the drill into the wood quickly what about the facilities for getting the drill out again for another cut? If a man must wait for a machine to make a hole and then wait for a loggy old-time weight to pull the drill out of the hole there are two waits to reckon with when it comes to counting the cost. To my mind the ideal lifter for this work is a spring and that should be so attached that the lifting force may be varied.

One of my machines has a chain fastened to the end of it which I fasten to a hook in the floor, changing it as suits the different jobs I am on. Three other machines have the head lifted by springs which are

adjustable. I believe a dead weight cannot possibly act like these springs of mine.

I have had a desire on a sluggish machine to remove the drill quickly when there has been trouble like the breaking of a belt, or some other accident, when on lifting the foot to the height necessary to allow the drill to come out I have felt the treadle come up against the bottom of my foot some secnds later. Of course this was a case where the head was lifted with a weight. A treadle attached to a head lifted by a spring acts quickly—like a thing of life—and will follow the foot as fast as the foot can be raised.

If one wants "results" he cannot afford to overlook a quick, snappy, active method of getting the drill or bit out of the wood. The speed that will allow of rapid downward motions of the drill and the power that will bring it back to position for a new cut are matters that require attention together and are equally important.

Care of Tools

We have now a perfect outfit—in mind—for boring, straight drills and bits, correct speed and the right well-adjusted machine for quick action. Now, with careful use and a certain knowledge of just what to do to the tools the rest is easy, and, I may say, pleasant,

Do not make the mistake of filing or grinding the tools too much. These are common mistakes. A little judicious use of the file or emery-wheel, and oilstone, is all that is needed. If there has been no injury to the tools from contact with nails or other hard substances a little "touching up" is all these nice new tools will require. Take pains to maintain their clean, clear-cut lines, and keep them sharp.

I have already said that the new tools are the correct general shape for the work, and so they are. But I have found for my class of work that the spurs of most of them are apt to be a little heavy—longer and thicker than will work well for me.

They run too deeply in the wood, as can be seen by the fact that the spur is often burned black, and, sometimes, smoke comes from the hole. Look into a hole when the smoke comes out and it will be found that the circle cut by the spurs is black, burned black, too.

I thin down and shorten these spurs at once so they will make only a little clear-cut circle in advance of the lips. This is all I have ever found necessary.

Filing the spurs is a rather delicate matter for the inexperienced but if one gets familiar with it it occasions no more concern than trimming one's nails.

Boring Through Several Pieces

Lately I saw advertised a special tool for boring through several pieces stacked or nailed together. This may be done perfectly with any spur bit or drill. The spurs must be made still thinner and shorter, or at least shorter than for general work.

With the long spur a "button" is made as the spur goes through the piece—the longer the spur the thicker the button—and as it is thick and strong it does not break up but remains whole on the end of the tool and revolves about between the tool and the top of the next piece, preventing the cutting.

If the spurs are filed short the "button" is thin and when the tool comes through the point will split it and it will break up and blow off with the shavings. But the success is all in making the spurs thin, short and small.

A Bad Tendency

In filing drills most men carry the hand that holds the file too high. This means a gradual reduction of the clearance and blunting of the drill so that it does not cut easily, or so smoothly either. The temptation is to hold the hand up and file near the cutting edge of the lip but the file should be held flat on the bevel, or clearance, and the whole surface filed down at once.

I assume that everyone uses a vise to hold the drills when sharpening.

Something to Try

The right clearance of drills and bits has far more than I think is generally known to do about their ease and smoothness of cutting. Sometimes if a drill or bit cuts hard and makes the hole rough take a good file and clear the lips a little more than they are found to be cleared when new. Then try it.

If it does not work satisfactorily give it a little more clearance and try it again. I have been greatly surprised to see how this effects the ease and smoothness of cutting. I try this almost always now when a drill or bit gets to cutting roughly.

Care should be exercised to keep the outside of the spurs in order. Sometimes they become thin or strike a hard substance and turn out—and sometimes in, too—so that they require filing or stoning at once.

Stoning

Frequently I find that a man will spoil the working of a drill by holding the stone on it improperly when stoning the spurs. A small stone is worse than useless for this purpose as the surface is so small that it is difficult to hold the stone flat to the side of the tool.

If the stone is not held flat against the tool the tool is tapered at the end, or, more correctly, the spurs are stoned off so that they begin to cut a hole smaller than the rest of the drill. This causes undue friction.

To obviate this fault, use a stone about 2½ inches long by 2 inches wide and hold it perfectly flat against the side of the drill. Do not stone lengthwise but around it.

Grinding

Most machinists know about sharpening drills so they will cut different sized holes. Occasionally it is necessary for the machine woodworker to do this also.

I have such a case before me now. A row of 88 holes must be bored close to the edge of a ½-inch board, the holes are 9/16 inch apart in the row and to fit a tube which is supposed to be exactly the size of a No. 26 drill.

I find the tubes vary in size. If I bore to fit the largest of the tubes the small ones will be loose; if I bore to fit the smallest the largest tubes will split the board when they are driven in because the holes are so near together.

To hit this case the drill is ground to cut the size between the two extremes. This we do by grinding it "blunter" to make the hole larger than the drill and more pointed to make it cut smaller, as the case may require.

Of course, the difference in the sizes of the tubes is very slight, very slight indeed. A little practice with a drill and a piece of wood and a tube or piece of wire will enable one to acquire this skill in grinding very quickly.

Here again I must say that for such boring as this speed is essential, almost everything to such work. A grindstone gait will mash down the stock and the holes will look as though a corkscrew had been turned into the wood and then pulled out. High speed will

cut clean, smooth holes, all of one size, in soft or hard stock.

Recently I bought a drill for a particular purpose. It ran "true" and did the work perfectly. A tool like that I lay aside so no novice may get it and abuse it. A few days afterwards I had occasion to use the drill again and was much surprised to find that it was very crooked. No adjustment in the chuck would make it run true. Upon examining the drill I found that it had been heated and for half or two-thirds of the length had taken on a beautiful blue.

Someone had found the drill in my absence and used it to make a deep hole in a piece of rock maple. Instead of drilling the hole quickly and pulling the drill out he had held it in there till it became smoking hot so that the temper was drawn, then it was removed and went from straight to crooked in cooling off.

This brutality is often done by those who do not understand the use of drills. Drills so abused rattle and clatter and hum in the wood and the workman does not know why. All he knows is that the drill doesn't seem to run as well as it did when new.

Of course such a drill cannot be depended upon to center properly and will be noisy. To keep the drills straight make the hole and remove the drill at once.

A Common Delusion

A delusion quite common among woodworkers is that in reboring holes the holes already made guide the drill. The fact is that the holes already made are a nuisance, literally, worse than useless.

On rough work it makes little difference if the reboring is not perfect, but let it be tried on nice work where the holes are near together and the result will show the need of some positive guide. There are auger-bit guides made and sold in full sets for this work and for all work where the holes go through the piece to be rebored I would recommend them. I have two methods of my own which are perfect and rapid for work where the hole does not go through the piece. These schemes I will here briefly describe.

First method: Turn a hardwood pin the size of hole already made, set it in a board of the size which may be fastened on the machine table, leaving the end of it extending above the board about 1/8 inch. Fasten this to the table with the center of the pin directly under the center of the chuck, insert the drill to be used, drop the hole to be rebored onto the pin and bore the required depth. This both centers the hole and holds the stock in place on the table.

Second method: This is for reboring, and, if required, counterboring also. For example, I will take a case which has just come in. A lot of holes in a 1-inch board must be enlarged. These holes were bored through with a 9/16-inch drill, then counterbored 3/4 inch deep with a 1-inch drill. The 9/16-inch hole is to be enlarged to 5/8 inch.

To do this work I take a piece of good maple 2½ inches long by 1¼ inches square and bore a hole through it endwise with the 5/8-inch drill. This maple piece I turn off to fit the 1-inch hole, making of it a sleeve which fits the 5/8-inch drill. I slip this onto the 5/8-inch drill and move it up or down as the work suggests. This may be kept from turning on the drill by two or three screws judiciously placed near the upper end and carefully turned in against the drill—not too hard, as the sleeve might split.

Insert this 5/8-inch drill in the chuck with the sleeve on it and one has a perfect guide for reboring such work. It also holds the work in place. To keep it from screeching wipe it with a bit of waste moistened with oil.

The work here spoken of is sometimes facetiously referred to as "punching holes." Much of it, it is true, is so poorly done as to deserve the name.

But I wish to urge all beginners to put quality into their work. Aim high even in boring holes. Study the work, the tools, the machine.

I hold the place I do as foreman of a mill-room and of a glue-room because I tried to excel in my work. This effort brings one to notice and gives him a chance.

Some men are always discontented and are making others so about them. They think they ought to be filling a larger place. Well, they ought, but it is a fair question for every such man to ask himself: Am I fitted for any better place than I occupy now?

Schemes for Promoting Punctuality in Workmen

INTEREST may be hung on an apparently minor detail, such as promptness and regularity in coming to work, to the advantage of both employee and employer, says James H. Collins in "The Saturday Evening Post." A certain factory was losing the output of valuable machines because the skilled mechanics operating them came late in the morning and sometimes did not show up for work at all. Absence on Monday mornings was most common, for drunkenness was the reason for it to a large degree. The superintendent shifted the payday from Saturday to Monday, thinking that if his operators had empty pockets over Sunday they would keep sober. That did little good, and reasoning with the men was likewise of little avail. They thought that all accounts had been squared when the boss docked them for being late or absent, and could not get the capitalistic viewpoint well enough to see that the boss was left with an idle investment on his hands—and they might not have cared anyway.

When the superintendent began keeping records of lateness and absence, however, and comparing one department with another, and posting the departments each week in the order of their records, the difficulty was put to the men in a new light. When the superintendent hit on the scheme of making Monday morning lateness and absence count double, the men were more careful on that unlucky day. Eventually this led to a healthy interest all through the plant in keeping equipment busy and making the work departments harmonious.

Another factory has a monthly thermometer scheme for showing up lateness and absence. A card hangs in each department, rules for daily entries, with a red thermometer outline printed in the margin. When an employee in that department comes late or is absent without due notice his name goes on the blank and a percentage is assigned his shortcoming. These growing percentages mark the height of the mercury, as it were, and the point is to keep the thermometer as low as possible, for each month the records of all departments are compared, and departments take rank according to their percentages. Such a scheme puts the matter of tardiness in a vivid way. The man who comes five minutes late might not think it much harm and would willingly let the timekeeper dock him; but if his five minutes' tardiness lost his department first place that month, and everybody could see his name on the thermometer form, the situation would be decidedly different.

The Management and the Foreman

A NEWCOMER in our midst the last few years, hailed by some as a basket in the bulrushes discovery, or a spontaneous production of genius, on closer acquaintance appears to many of us as a reincarnation of an old friend, writes W. R. Smith, in Wood-Craft.

Scientific management, heralded as the panacea for curtailed production and increased cost by its sponsors in the manufacturing world, finds field for demonstration in inverse proportion to good and intelligent foremanship. The ideas of its foundation aside from increased pay under one disguise or another as a stimulus of increased concentration of effort on the part of the workman are only those inherently a part of the foreman's duties with or without the detail of cost-keeping as that may or may not happen to be.

While the advocates and exponents of "scientific management" may be able to point out cases where the adoption of methods of handling manufacturing processes under that caption have shown an increased production of 100 per cent. or more or where costs have been reduced thus incredibly it is likewise a serious reflection on existing previous conditions and dollar for dollar of net results condemns not alone the foreman but all those responsible for them.

It has been contended for some time that with the increasing effectiveness of machinery and the greater segregation of processes and in specialization the American workman would soon show marked deterioration in that fewer and fewer would be familiar with all the details and that unskilled labor could readily be taught to perform one or two operations of a process which included perhaps twenty or more all so apportioned and thus no one of the operatives even after long service being able to begin and complete. May it not be that this too is one of the causes contributory to a condition where the high salaried man is justified in taking over the petty offices of the subordinate merely that they require a little judgment?

With the growth of other things and the development of machinery and material equal progress in the training of high grade foremen has not kept pace. Were this not true he would—the average foreman—be capable of handling his own work better than another could do for him, especially a stranger.

The quest of the easier, quicker, more effective way, the elimination of useless effort and misspent energy, are regular duties of the efficient foreman. The assigning of tasks and instruction if neglected to an extent that others must assume and supplant speaks ill of the institution where such is the case.

What need of the foreman of to-day awaiting the arrival of the "scientific management expert" before making time studies or even possessing a chronograph?

Then, too, why should a management curtail the common scratch paper supplied a foreman for his work and at the same time consider calling a high salaried man to study detail and afterwards recommend a list of stationery which would make a foreman dizzy for the purpose of keeping track of the things which should be vivid in his mind? Or why should they not furnish chronographs to their foremen?

The answer is brief. In days gone by the shops were small, hand work was more common, good men stayed with the same company year after year, they became familiar with all the work done, and received good wages and earned them.

From their ranks foremen were taken. To-day a Hottentot may feed the planer and a Caesar or two off bear. Greeks and Slavs and Southern Europeans of one nation or another seem to be the only part of our population who care to soil their hands. Will they make foremen?

Our young men are studying to be stenographers or some other something which is supposed to call for intelligence. Can you make machines out of men and not later on wish you had men?

Absolutism in Accurate Planer Practice

By T. Morgan in Wood-Craft

OPERATORS and students of the practical and technical features of woodworking have argued and debated for more than a decade now about the grinding and adjusting of the knives on the cutter-head of the planer.

About the time we had developed a generation of skilled workmen who asserted with more or less vehemence that they could set four knives on a cutter-head so that each would extend absolutely the same as the other and do perfect work, there was brought out an entirely new type of planer embodying in its make-up the use of thin steel knives and a piece of abrasive material attached to a rigid slide bar for jointing off the knives while the cutter-head is in motion.

This scattered to the four winds the idea of absolute correctness in the setting of knives with even the best appliances, because it soon demonstrated that the most skilled mechanic had never been able to set them anything like true when one gets down to what I call "absolutism."

There immediately entered a new era in the planing world. Instead of feeding flooring, of which this was made a strong feature at first, through machines at the rate of 30, 40 or 50 feet a minute, it was put through at the rate of 90 feet a minute and claimed to come out much smoother than the old-time work.

This was considered startling, but the people had hardly digested the 90 feet a minute feed and the idea of jointing knives on the cutter-head while in motion until other machines came out and there were new records reported in the rate of feed passing the 100 mark and eventually passing the 150 feet a minute with every indication and disposition of going to what might be termed shotgun speed limits. High speed planers are more valued, however, on narrow flooring stock than for cabinet work in the modern furniture factory.

In the earlier days of this development there was discussed at some length the need of some mechanism for grinding knives right on the machine so as to insure absolute equality in the cutting points of the knives. It was then considered impractical, however, because grinding of the old-time heavy planer-knife was a slow, tedious process and it would be impractical to keep the machine standing idle during the grinding of four knives, to say nothing of the difficulty of arranging and attaching the necessary grinding mechanism to the machine.

The thin steel knife idea, however, and the new types of cutter-heads have made possible and comparatively easy what heretofore has been considered impractical, and that is the attachment of grinding mechanism as well as the jointing device to the machine itself so that a knife may be ground right on the machine without removal.

Furniture Factories of the Queen City

The Gold Medal Manufacturing Company, Limited, Toronto

THERE are a number of important furniture factories with headquarters and plants at Toronto. Among these the Gold Medal Furniture Manufacturing Company occupy an important position on account both of the extent and variety of their output and the excellence of their finished products. The chief lines of furniture produced by the Gold Medal Furniture Manufacturing Company, are parlor chair and couch frames, diners,

Mr. W. J. McMurtry, President of the Gold Medal Furniture Manufacturing Co., Ltd., Toronto

davenport and bed frames. "Gold Medal" products of this nature are favorably known throughout Canada, as all the best furniture dealers in the country make them a special feature in their stocks.

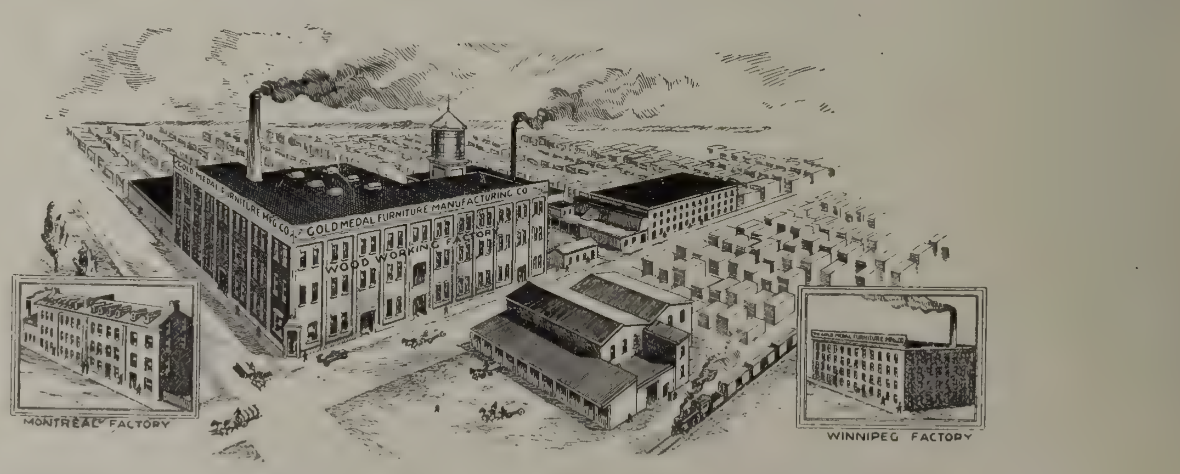
The head office and largest factory of the Gold Medal Furniture Manufacturing Company, Limited, are situated at the corner of Van Horne street and Bartlett avenue, Toronto. The company also own branch factories at Montreal and Winnipeg and have a warehouse at Vancouver. An additional factory has recently been purchased from the town of Uxbridge. This factory will be in operation early in 1913. The necessity for additional manufacturing space has been forced upon the company by their steadily increasing business, and the plant at Uxbridge is favorably situated owing chiefly to its proximity to the factory at Toronto. The Uxbridge factory will be devoted to the woodworking department which will be transferred from Toronto under the management of Mr. Robert Wright, the present superintendent of the Toronto factory.

Mr. W. J. McMurtry, President and Managing Director of the Gold Medal Furniture Manufacturing Company, Limited, founded the company in 1890 on its present site, and has been identified with it since that time. He has in fact been the moving spirit in the business and it is due to his efforts that the affairs of the company are in so satisfactory a condition. The company is a close corporation, the stock being in the hands of five or six people, of whom Mr. McMurtry, is the chief stockholder.

Output of the Company

The quantity of lumber used annually by the company is in the neighborhood of four million feet. About one and a half million feet of this is maple which is consumed, chiefly in the manufacture of spring bed frames, which are made entirely of maple. The other 2½ million feet consists of oak, birch, elm, ash and mahogany. The birch and mahogany are manufactured into parlor frames. Oak is used principally for davenports, couches, easy chairs, and mission furniture; and elm enters largely into the manufacture of mantel beds or folding beds which have the appearance of a mantel and are extensively sold in the northwest.

A trip through the Toronto factory of the Gold Medal Furniture Manufacturing Company, Limited, is an interesting experience. After visiting the various departments, seeing the working of the different machines and having the processes explained by the superintendent, Mr. Robert Wright, the visitor can



Toronto, Montreal and Winnipeg Plants of the Gold Medal Furniture Manufacturing Co., Ltd.

understand how the high standard of quality of "Gold Medal" furniture has been attained.

To follow the lumber from its arrival at the private siding of the company until it leaves it again as a finished article of furniture is most instructive. The first process is the drying. The lumber is taken from the cars directly into the drying kilns, which have a capacity of 50,000 feet per week. It is then placed on cars and taken to the cutting-up departments, which are situated on the ground floor. In these departments the rough work is done, i.e., the lumber is cut to proper lengths and widths, moved on to the stickers, jointers and planers, and assorted approximately as to size. An elevator takes this material to the second floor where it is glued up and finished through a Berlin surface planer. The lumber is then taken to the band saws, cut to the proper suites and shapes, and passed to the shaper where it is shaped on forms to the correct size.

The next operations are trimming and boring and the furniture is now ready for the sanding department, where it is sanded and cleaned up properly before going to the assembly rooms. After assembling, the furniture is again put on the elevator and sent to the third floor to the finishing department. In this department the articles are stained and receive their first coating before being delivered to the varnishing department where they receive from three to five coats of varnish. The varnish having dried, they are rubbed and polished ready for the upholstering department. The upholstering department is near the shipping department, so that the furniture does not have to be moved more than is absolutely necessary.

All the machinery and equipment in the factories of the Gold Medal Furniture Manufacturing Company, Limited, is of the latest pattern, and they have no hesitation in scrapping anything which is getting out of date. They also take every precaution to obviate accidents to their employees by protecting their machinery as much as possible. In addition to this, all the machinery in the factory is provided with the fan system for removing dust and shavings. A description of some of the special machinery and equipment noticed is of interest.

Special Machinery Installed

A machine for making couch feet and corner blocks for couches has been invented by the superintendent of the factory, Mr. Robert Wright. This ingenious machine not only makes the couch frames 50 per cent. stronger, but also enables the company to ship the couches in the k.d. state, thus saving half the freight to the consumer. On some of the furniture fine carving is done; for which remarkable carving machines are used. The Symonds carvers, which carve two or more pieces at the same time, do more accurate work than can be done by hand carvers and at half the cost.

A bending machine, which consists of hollow plates fill with steam, can bend and dry their chair backs in one operation in the short time of twenty minutes. This machine is also much more economically than the older types, as it handles successfully a large proportion of backs which would have been broken on the old machines.

Uxbridge factory of the Gold Medal Furniture Manufacturing Co., Ltd.

Another machine which is giving good results is the Berlin Continuous Feed Jointer. This jointer does the work of six machines, one of its best points being that the operator is protected from risk of accident. A Berlin Finishing Surface Planer turns out fine work and does away with the old method of chipping out. It also saves half the cost of sanding. A new drying room which has been recently installed in the finishing department by Pratt & Lambert, of Buffalo, has proved a great time saver. In this room from 12 to 15 parlor suites can be dried at one time, a temperature of from 120 to 130 degrees being used. By the old method of drying, from 15 to 20 days was required.

Fire Risk Reduced to a Minimum

As a precaution against fire, the sprinkler system is installed throughout the office and factory. In addition to this, a volunteer fire brigade has been organized among the employees. A 500 gallon force pump is always ready and a plentiful supply of water is pro-

vided by a tank on the building, which has a capacity of 20,000 gallons. A surplus supply reservoir throughout the factory and office is supplied by means of three boilers and a 270 h.p. Wheelock engine. The Toronto factories occupy a floor area of 130,000 square feet.

The new factory at Uxbridge is equipped with the latest improvements. One of the newest "Morton" kilns for drying lumber, with a capacity of 25,000 ft. per week has already been installed. As at Toronto, the sprinkler and fan systems are in use throughout. The company own a private siding on the G. T. R.

In addition to the products already mentioned, the Gold Medal Furniture Manufacturing Company, Limited, are large makers of mattresses, "Hercules" bed springs and steel couches. Ingenious and up-to-date machinery is used for threading these "Hercules" springs.

The present total staff of the company is 225 and it is expected that an additional 100 men will be engaged for the new factory at Uxbridge at the beginning of the year.

Woodworking Facilities at Shawinigan Falls Technical School

THROUGH the generosity of Mr. A. E. Aldred, president of the Shawinigan Water & Power Company, the town of Shawinigan Falls has one of the best technical schools in the Dominion, erected at a cost of $50,000. The principal is Mr. J. V. L. Morris, the woodworking instructor Mr. W. H. Meddick, and the electrical instructor Mr. MacKavanah.

The departments include a very excellent woodworking section, the equipment for which, with small exceptions, was supplied by the Canadian Fairbanks-Morse Company, Montreal. The manual training machines were manufactured by the Oliver Machinery Company, of Grand Rapids, Michigan, for whom the Fairbanks-Morse Company are Canadian agents.

The equipment is electrically driven, and includes manual training benches, electrical glue heaters, independent electrically driven woodworking machinery, such as motor-driven oil stone grinder, saw bench, lathes, etc. Altogether ten benches have been supplied.

The Oliver down belt drive speed lathe has a new hand tool rest mounted on the carriage. Variations of speed are obtained by means of a four-step cone attached to the armature shaft of the motor, which is placed under the housing beneath the bed. The bed consists of a cored casting 6¼ in. deep, 6⅝ in. wide, and either 48 in. or 60 in. long. The tail stock is of the open side design, secured to the bed by a positive lever clamp. The tail centre is removed by backing of the screw. On lathes with carriage, the tail stock is furnished with a set-screw device for taper work. The compound rest carries the slotted tool post, the apron having a bearing of 10 in. on the bed and a travel of 37 in. on a bed 60 in. long. The face plates and roseate chucks on the lathe are interchangeable with any other, the first is provided with six screw holes, three equi-distant for large diameter and three for smaller. The roseate chuck is also provided with three holes in addition to its central screw.

The Oliver variety saw bench is fitted with two miter gauges, arranged to slide in the table grooves on each side of the saw. The saw guard is attached to the column, and a clamping nut secures the vertical bar or splitter at any position for raising or lowering the entire guard. The capacity is sufficient to take a saw 12 inches in diameter. The table is of cast iron and is 28 in. x 30 in. Two grooves, equi-distant from the saw line and 8 in. apart, are milled into the top to serve as slide ways for cutting off and angle gauges. A recess is cast about the saw for applying and removing the blade, and this is filled with a removable steel plate. A vertical rise to the table of 4 in. maximum is provided by mounting it in a machined dovetail slideway 7 in. wide and controlling it by hand wheel and bevel gearing actuating a screw and nut. It will tilt to an angle of 45 degrees through the slotted rockers that connect the top portion of the table to the elevating yoke. It is held at the desired position by means of a locking lever. The saw arbor is 1 in. in diameter where the saw is applied and 1 3/16 in. in diameter in the bearings. It revolves in ball bearings, which run in a lubricating grease to prevent cutting; by the use of ball bearings the amount of friction is also reduced —a point on which the makers lay considerable emphasis.

The combined revolving oilstone and grinder was made by the Mummert-Dixon Company, of Hanover, Pa. The machine is provided, in connection with the oilstone wheels, with a regular grinding wheel carried at the back of the upper spindle. By using a narrow wheel this can be used for gumming saws, grinding moulding bits, etc. On the front end of the spindle is mounted the grinding cone and leather stropping wheel. It is also provided with a swinging table for supporting a tool holder, which may be used for holding chisels, plane bits, etc. When it is desired not to be used, the table can be swung down underneath the pan and out of the way. Then the grinder can be used as an ordinary grind stone, holding the tools by hand. The speed of the upper arbor is 1800 r.p.m., that of the oilstone wheels 260 r.p.m., and of the counter shaft 500 r.p.m.

Improvements at Gilchrist Planing Mill, Toronto

Important improvements are being made at the J. C. Gilchrist planing mill at Toronto. The 80 h.p. engine formerly used to drive the machinery has been replaced by one of double that capacity. The business of the firm has developed rapidly of late and with a view to providing more yard space the company have purchased a property facing Perth avenue. The building and yard now cover a whole block, fronting on three streets and having a railway siding on the west side. On the land just acquired, a new lumber shed, having many interesting features, will be erected. This will enable the firm to carry a large stock of hardwood and other kiln-dried lumber, as well as built-up panels, etc. The Gilchrist firm combine a large retail lumber trade with all kinds of planing mill work. They also make a specialty of fine interior trim, as well as the manufacture of sash and doors of every description.

Sandpaper should be used for cleaning and smoothing purposes only. Do not depend upon it for doing the tool work.

Manufacturing Sawdust

IN one large factory, very favorably situated for the sale of sawdust for butchers' and merchants' use, the demand for sawdust greatly exceeded the supply. On the other hand, shavings were a drug on the market, and were burned under the boilers or hauled out on the dump. Some little experimenting was necessary to increase the supply, for sawdust was bringing very attractive prices.

The solving of this problem was finally accomplished by the millwright, who had been doing a little tinkering on the shavings exhaust head. Based on the idea that separating the shavings from the air in the exhaust head, the larger and heavier ones would spiral down at a steeper slant than the fine material, he did a little drilling in the shavings exhaust head with a ¼-in. drill bit.

Working around and below the shavings inlet pipe as far as he thought the fine material would sink in that distance, he drilled until he struck the right spot. At the first holes there was a current of air, but no shavings, but on going down some 6-in. farther he struck a place where a chip would catch and hang in the hole until another came along and knocked it out. On going back into this narrow 6-in. zone, he found that small chips and sawdust would follow one another through the hole in a steady stream.

By drilling between ninety and 100 holes in this small zone, and covering them with a hood, practically all the fine material from the shavings system was led down to a separate compartment of the shavings house. In this separate compartment was a flexible suction spout connected with the regular sawdust collector system. One man could easily feed this material into the sawdust system as fast as it could be shoveled from the sawdust bins at the other end.

This material was slightly more irregular than sawdust, but answered every purpose just as well, and could not be readily distinguished from the real thing.

Methods of Motion Study

By Charles S. Miller

MOTION study is a valuable and useful instrument to use in performing the operation of cutting costs. It is also a dangerous instrument, this on account of two principal reasons: (1) It takes time to make motion studies, and a great deal of money can be very quickly spent in making observations which may develop later as having little or no practical value. (2) Unless the workmen are handled right, they are apt to get the impression that the studies are being made with the sole purpose in view of cutting rates.

In the mind of the uninformed there is apt to be some confusion between motion and time study. We might say the former is qualitative and the latter quantitative. Motion study analysis determines the proper elementary motions necessary to accomplish a certain act. It eliminates all unnecessary motions and determines the arrangement of the work to enable the operator to execute the sequence of motions with the least expenditure of effort and time. It is a motion study that effects savings.

Time study is measure; it determines standards by which we can measure the relative efficiency of the old and new methods. It serves as the basis in setting prices on piece work or the standard time on bonus work. Time study is complementary to motion study. It is necessary so that we may establish standards which must be lived up to by the operator, and these standards can only be reached by operators working under this new method.

To the average workman it seems too much trouble to make the effort to break away from the old method of doing his job and working his mind long enough to create brain channels that will telegraph the new motions to his hands. Written instructions, wage incentive, personal direction, and, for a time at least, constant supervision, are all necessary. In the case of much foreign labor the work must be done without the written instructions to the workman.

After a time increased wage return, less fatigue, and the habit formed of doing the work in the correct way, insure the performance of the operation in the standardized manner. The matter of training workmen in habits of industry, in the doing of their work in the proper manner, has a humanitarian as well as a commercial aspect.

One feature of time study is worth mentioning, though it is opposed to the fundamental principle of mutual confidence between employer and workman; it is practically impossible for an operator to fool an experienced motion and time study man by "soldiering" on a job under observation. Five to ten timings of the elementary motions in an operation, establishing a standard time for each motion, not an average, and summing the unit standard times, will invariably give a fair total time for the complete operation.

In addition to establishing a standard method of accomplishing a job, motion study brings the individual workman under close observation, and this enables the employer to fit the workman to the job. It makes possible the consideration of the personal equation of the operator in selecting him for a certain operation. In my examples of motion study, taken from actual practice, comparatively simple operations have been chosen, both on account of the greater clarity in description and because it is in the simpler operations that often lies the opportunity of greater economy in movement rather than in ones of more complexity.

Proposed Standard Box

LUMBER manufacturers who depend on the box trade for the sale of a considerable proportion of their product are interested in the effort now well under way by the box manufacturers to formulate a standard of thickness and sizes for various kinds of boxes. The effort which is being made will, it is hoped, result in making boxes used for certain purposes just as standard in every way as the sugar or flour barrel is at the present time, says the New Orleans Lumber Trade Journal. Lumbermen will be benefited, for it is the idea of the box manufacturers behind the movement to insist on a standard of box which will insure the safe carriage, under all normal conditions, of the commodity for which it was designed. Another object of the advocates of the standard box is to do away with the use of lumber too thin for the purpose needed, in order to cut down the cost to the shipper. If present plans can be carried out, as there is every indication they will be, lumber manufacturers will be able to sell not only more lumber, but of a better grade to the box people.

Ambition and hard work are a team. Neither makes headway without the other.

The Manufacture and Testing of Glue

By J. W. Beiger, Mechanical Engineer and Glue Expert, Mishawaka, Ind.

AT the outset it may be well to give some consideration to the source and manufacture of glue. The organisms of all animals, but more especially of the higher classes, contain tissues which are insoluble in cold as well as hot water. However, by continued boiling, they become dissolved and yield on evaporation of the solution a glutinous mass. By further drying this mass exhibits, according to the degree of purity of the material, a more or less transparent and brittle substance, which in its pure state is devoid of color as well as odor; it swells up in cold water and dissolves upon being heated in that liquid. This substance—that is, the conversion of the so-called glue or gelatine yielding tissue—is what is known to the trade as glue.

Neither glue nor gelatine exists ready formed in the animal organisms, except under abnormal conditions of disease, but they are the products of various transformations.

The raw materials used in the manufacture of glue consist of a variety of animal offal. The principal substances employed are refuse of tan-yards, such as scraps of ox and other thick hides, the waste of work-shops of leather dressers, etc. The tendons and intestines of many animals, rabbit and hare skins deprived of their fur, cat and dog skins, scraps of parchment, waste of tuners and button makers, and the offal of butcher shops and households help to swell the series of materials used for the manufacture of glue.

The materials are collected and sold either directly to a glue boiler, or to a dealer making a specialty of glue stock. The glue stock is then placed in large vats containing a strong solution of lime water. This frees it from all fleshy and bloody particles, and especially decayed matter. The stock is then treated with an acid so as to neutralize and preserve it. From here the stock is placed in large kettles and boiled. After separating it from all settlings and grease, it is put into coolers and allowed to chill, forming a stiff jelly. The jelly is then sliced and dried. It is then run through a crusher and broken up. This is the commercial appearance in which it is generally found. So much for the source of glue.

How to Determine the Value of Glue

A matter in which you will be more interested is how to determine the value and grade of a glue at the time it is delivered at your plant. There are few places where the consumers are equipped to scientifically analyze glue, and to those who are not it will be interesting to know just how this work is carried on, so that the covering capacity as well as the strength of a glue may be determined before any of the glue in question is put into the spreader.

This system is of vital importance to you, for without it is rather dangerous business to experiment with glue out in the plant and then put the reputation of your house back of that glue.

The glue manufacturer grades his glue in some cases by viscosity, in others by the stiffness of the jelly and the remainder by the price he can get for any old glue.

Taking the first means of testing, we will look into that and see of what value it is to you. By viscosity, we mean the body or thickness. For example, take milk and cream. Milk is thin and has a very low viscosity, while cream is thick and has a high viscosity. The above will also serve to explain that the viscosity of a liquid has nothing to do with the specific gravity, and cannot be determinel by any floating glass instruments or hydrometers, which so many of the consumers believe.

To determine the viscosity of a liquid we allow a constant volume of that liquid to flow out of some containing vessel through a small opening at the bottom, and catch the time required to empty the vessel. The time in seconds is the viscosity, and the instrument is called a viscosimeter.

The value of this instrument to you can best be explained by an example. We will take the following conditions of a glue consumer—he is using a glue at 10 cents a pound. The viscosity of that glue in a 33.3 per cent. solution is 15 seconds. Now he wishes to determine whether a certain glue he has received is worth the price quoted, and if a more economical glue for him to use. He will therefore make up a small batch of the glue in question and take its viscosity in a 33.3 per cent. solution. We will assume that the result of that test was 10 seconds. That being the case, one thing is certain, the glue in question does not make up as heavy a liquid as the glue he is using, therefore it will be necessary to add more of the test glue to the solution, so as to bring up its viscosity. By the use of tables and curves, he is able to determine that the glue in question will have to be made up in a 37.5 per cent. solution so as to have the same viscosity as the glue he is comparing it with. That is, the glue he is generally using has a viscosity of 15 seconds in a 33.3 per cent. solution, while it takes a 37.5 per cent. solution of the test glue to give the same viscosity.

From the data now at hand it is an easy matter to figure the value of the glue, and the result of that calculation gives 8.9 cents. Therefore, this is the value of the glue to our consumer, and he will have to buy it at that price in order to get the same efficiency out of it as he is getting out of the glue he is using generally.

So that the above line of reasoning will be better understood, the following statement should be made: A batch of 100 pounds of liquid glue having a viscosity of 15 seconds, will cover the same amount of surface, if used in the same glue spreader, on the same kind of work, at the same temperature, regardless of the amount of dry glue there was put into that batch. Viscosity determines spread.

The word viscosity seems like a very scientific expression and is generally pronounced with great stress. But, gentlemen, it is only a term that tries to explain what every practical user of glue has endeavored to determine, the exact thickness of the body of glue. However, by the use of a viscosimeter there is no guesswork, and once the proper body of glue has been established for your work, you can always maintain that body, regardless of the grade of glue you have at hand. By being able to maintain a uniform body you have taken one step toward uniform work, and one step toward uniform cost of work.

While this system is not being used universally as yet, it is going to be used more and more as time goes on. It may seem strange to you that while there are

a great many manufacturers of glue in this country, no two of them produce the same grades of glue, and stranger still, not any one of them can produce exactly the same grade from day to day. Each boiling must be analyzed for its grade. That being the case, unless you are checking up the quality of glue as it is delivered to you, there must be a variation in the grades of your glue. A statement of facts on this variation will seem very large, but there has been found no shipments of glue from the same house, supposed to be the same quality and paid for at the price, a variation of 40 per cent. in viscosity.

The Jelly Strength of Glue

The second means of testing, viz., the jelly strength, is used very largely by the manufacturers in grading their product. The old finger test is being used in many places at the present time. This finger test is very inaccurate and is conducted as follows: Samples of the different glues as well as standard glues are all made up in the same per cent. solution, and allowed to cool. They are then compared with the standards by pressing on the jelly with the finger to determine jellies having the same stiffness. Any glue having the same stiffness as one of the standards, is equal to that standard and priced according to the standard.

A more accurate way to test the jelly strength of a glue is to make them all up in the same per cent. solution and allow them to come to a standard temperature. Then actually weigh the pressure required the standards by pressing on the jelly with the finger test, the temperature is a very important factor, as one degree makes a difference of two pounds in the jelly strength. The greater the pressure required to force the plunger through the jelly, the better the grade of glue and the greater will be the adhesive power.

Referring to the standard of glue as they are advertised on the market, the best grade has a viscosity of 34.5 seconds, and a jelly strength of 48 pounds, while the poorest grade has a viscosity of 6 seconds and a jelly strength of 7.2 pounds. From the consumer's standpoint, he cannot be guided by either one of these tests alone; he must take both, for in the case of viscosity foreign matter is apt to be in the glue, which would make it appear to be very heavy in body, but upon taking the jelly strength we find that it is low, therefore the viscosity was not the true viscosity of the grade, but was due to foreign matter. A glue must have for its viscosity the proper jelly strength, and by making the two tests side by side, the true value of a glue can be determined.

Not only does this allow the consumer to take advantage of the best values that are offered, but he is in a position to compel the glue manufacturer to deliver the same grade to him in every shipment. Should any shipment arrive that is not up to the standard he has the means of rejecting the shipment, and thus avoid any inferior glue getting into the work.

By the use of these same tests, the heat damage done to the glue as it is in use out in the plant can be determined, and where it is large, means to stop that loss are affected. In places where the consumers have the equipment to make these tests, it is a fact worth mentioning that with the very best results as to quality of work, the cost is around two dollars per thousand square feet, and in places not equipped the cost is much higher, and in many places the quality poorer.

There are several good reasons why this system is not in common use by the consumers at the present time. The first is, that it is not to the interests of the glue manufacturers to have the consumers educated along these lines. Another is, that it has never been shown to them from a practical standpoint. The work was always laborious, and the results hard to get. By the present system all unnecessary work has been eliminated and the results are absolutely accurate, short and simple.

Heat Damage Greatest

Leaving the laboratory and going into the plant, without a doubt the greatest loss is in the heat damage. A twelve-cent glue will lose in value at about the rate of one-half cent per pound per hour. This fact is hard to see, for as the glue is going down in grade water is being evaporated out of the solution. The two will offset each other and the body of the liquid will remain about the same. But, nevertheless, the quality of a joint made by a twelve-cent glue after it has been under the action of heat for ten hours, is no better than a joint made from a fresh batch of glue of eight-cent value. There are at present a great many paying a good price for glue and allowing the heat damage to cause them to use a very poor adhesive.

Equipment for making up a batch of glue in as short a time as possible, not allowing it to stand around or soak, having the apparatus so arranged that only a small amount of liquid glue is on hand at one time, and last, but not least, having it so the place can be kept clean and sweet, these are a few of the things an expert must look after for his clients.

There are other materials used as adhesives, and no doubt vegetable glue comes next to the animal glue. However, by shrewd judgment in buying and using of materials a saving equal to that in the animal glue can be accomplished.

In concluding, I wish to thank you for the opportunity of speaking here to-day. I only hope that you will be benefited by my remarks. If you have, then this address has accomplished its purpose.

Artificial Ebony From Oak.

A consul in France gives the following process for converting oak wood into artificial ebony:

The blocks of wood are immersed forty-eight hours in a warm saturated solution of alum and sprinkled several times with a decoction of log-wood. Smaller pieces may be steeped for some time in the decoction, which is prepared in the following manner: One part of logwood of best quality is boiled with ten parts of water. It is then fitted through linen and the liquid evaporated at low temperature until its volume is reduced by one-half. To every quart of this bath is added ten to fifteen drops of a saturated solution of soluble indigo. After having watered the block several times with this solution, the wood is rubbed with a saturated and filtered solution of verdigris in warmed concentrated acetic acid. This operation is repeated until a black color of the desired intensity is obtained.

In planing end grain never run the plane entirely across the end, but work from both edges toward the center of the piece. This prevents the splitting of corners.

In boring never bore entirely through a piece, but reverse the piece and finish the hole from the other side after the worm penetrates.

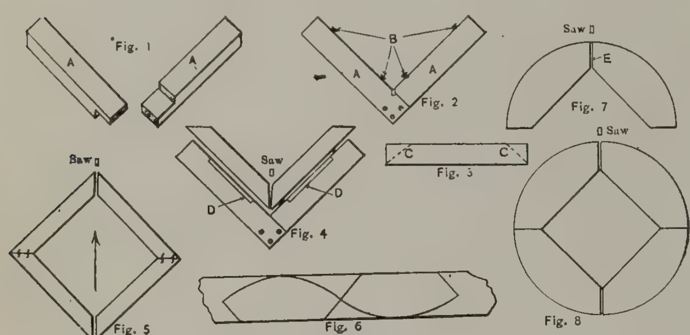
Short Cuts in Mitering

As a substitute for the miter saw, the following device may be of service to one who has only a few pieces to miter: Make a frame of two pieces of hardwood 14 inches long, 3 inches wide and 1¾ inches thick and cut with a shoulder on each piece as shown at A, Fig. 1. Fasten these together with three screws so they will make a square as in Fig. 2.

On the inside edge of pieces at A place four screws as shown by B, Fig. 2, and let the heads project ¼ inch. These are to be used as adjustment screws so that the pieces to be mitered can be cut square.

Take the pieces to be mitered and lay out one with miter square as at C, Fig. 3, to be used for a pattern. Cut the miters roughly on band-saw, then place the two pieces in form as at Fig. 4. Pass form and pieces through band-saw. Close pieces together and pass through again if necessary.

After mitering all pieces in this way and securing together with corrugated fasteners or nails, you place two halves together as in Fig. 5. Pass through band-saw till joint is made. Of course if you have a power driven miter-saw this plan is too slow. This same scheme can be used in getting out segments for circles to be turned for patterns or caps and bases for columns. Dress the material on two sides to the required thickness and mark out by a pattern, Fig. 6. Band-saw the segments and place two of them together and pass joint through band-saw and nail with corrugated fasteners as shown at E, Fig.7, one on face and two on back. After all are jointed and nailed up in halves place two halves together and pass joint through band-saw as in Fig. 8. After nailing they are ready for turning.



Short Cuts in Mitering

Have band-sawed and jointed up circles of six, eight and ten segments 54 inches diameter and 6 inches thick in this manner.—Chas. M. Allen.

A simple door fastener recently brought out in England is of a nature to be readily carried in the vest pocket and consists of a small perforated steel plate, at one end of which are two teeth bent at right angles to the plate, while to the other is attached a short stretch of chain carrying at the end an iron pin. In order to use the device and securely fasten the door all that is necessary is to press the teeth into the rabbet of the door frame, then close the door and insert the pin in one of the three holes with which the plate is perforated. In this form the fastener is adapted more especially for the use of travellers who sometimes find themselves in a room in which they wish to secure themselves against intrusion, but which has a defective lock or possibly none at all. If it is desired to place the fastener permanently on the door frame a screw may be inserted in one of the holes in the plate, this being countersunk for the purpose.

Economy in the Use of Factory Supplies

By Joe Blakely, in the Wood-Worker

In some wood-working plants, supplies, such as files, belt repairs, tools, material, etc., are painfully conspicuous by their absence. There is little wonder that the workmen (and foremen, too) get careless about their machines and their work as well, when there is nothing provided with which to keep things in proper repair.

The writer had an experience a few years ago in a plant of the kind mentioned. In this particular place a new file or a new belt was looked upon by the proprietor more as a luxury than a necessity, and the red tape in connection with getting either would try the patience of Job. As my duties consisted of a general supervision of the entire plant, the department foremen thought that, with a new superintendent, chances might be somewhat better to get the needed supplies.

My first week on the job found me with an unusual number of requisitions from the different departments for such ordinary supplies as were necessary to carry on the work, and each with a rider to "rush," as the items mentioned were urgently needed. The demand being rather out of the ordinary, I thought I had better look into the matter, and after investigating I was satisfied that while the demand was great, yet it wasn't elaborate and not at all out of reason.

The list being a large one and myself new on the job, I consulted the proprietor about it. After looking over the list, he remarked that he suspected things were in poor shape, as the man before me neglected to keep supplies on hand, and for me to go ahead and order what was needed and hereafter always keep a full supply on hand. I forthwith ordered the supplies as per requisitions, and, as the goods arrived, checked them up and O. K.'d the invoices and returned them to the office. Things ran along smoothly until the accounts came due. I was then called to the office to explain the necessity for such an outlay, and the following is what took place, as nearly as I can remember:

Proprietor—"How does it come we need so many different kinds of files? All we ever bought before was one kind of flat files and one kind of three-cornered files. Here we have planer files, mill saw files, auger bit files, two items of taper files and one of band saw files."

Myself—"The variety may seem large, but it is only the bare requirements. It is not economical to file the planer knives with a mill saw file, and to file saws with a planer file would be out of the question, as they are not adapted to that kind of work."

Proprietor—"But that only accounts for two items, and here you have six. What about these auger bit files? We never bought them before."

Myself—"I think if you had spent more for auger bit files in the past it would have cost you a great deal less for bits. The bits I examined were not worn out by use, but were ruined by being sharpened with a wrong kind of file."

Proprietor—"I am from Missouri; show me one of those auger bit files and a bit."

I produced a file and two bits, a new one and one spoiled in filing; they were examined carefully.

Proprietor—"Alright. Now about these two sizes of taper files; are they both necessary?"

Myself—"They are both necessary. One is for the large-tooth cut-off saw and the other for the fine-tooth trim saws."

Proprietor—"It seems to me all we ever had before was one size."

Myself—"It would be possible to file the trim saws with the large file, but it is not practical, for a much better job can be done in less time with a file the proper size."

Proprietor—"Here is another item of slim, blunt band saw files."

Myself—"The choice between blunt and taper files for the band saws lies chiefly with the operator. These are regular band saw files and are better adapted for filing band saws than the ordinary taper file."

Proprietor—"If every line of supplies has a variety similar to that of files, it will take a fortune to pay for them."

Myself—"We cannot very well expect the men to product the work unless we furnish the necessary tools and facilities to do it with."

With this our interview on the item of files ended, and I had formed my own opinion of the proprietor, and had also been convinced of one of the reasons why my predecessor had departed. This proprietor was one of the many who started up a business in which he had had no practical experience. The fact that others engaged in the same line of business were showing dividends, while he was showing deficits, led him to believe that the fault was either in the foreman or the men not working hard enough. In reality, the trouble was insufficiency of the proper facilities.

There was no amount of argument that could convince this man that there was more than one saw needed for a machine or more than one set of knives needed for a planer. When a saw got dull the operator either filed it himself or waited till some one else did it, and in the meantime the work being done also waited. The same rule applied to everything about the place. The matter of belting was, I believe, the greatest handicap about the place, and with lacing hard to get, the task of keeping belts in repair added materially the deficits the auditors found in the proprietor's books.

Machine men can readily understand how shapers, stickers, planer and other high-speed machinery would run, with as many as a dozen horsehide lace joints in a belt. Belts were continually breaking and the operators were just as often hunting for something to fix them with. It may seem hard to believe, but nevertheless, it is a fact, they would hunt up some old pieces of belt and take out the old lace with which to fix their belts. This sort of thing went on so long that even the old pieces were hard to find, and the case of a machine being out of commission for an hour on account of a broken belt was a daily occurrence.

There were a good many capable mechanics who had given this place a trial, and without exception all had left in disgust. There was absolutely nothing about the place that offered the least encouragement for a man to put forth his best effort. The proprietor's bullheadedness and lack of capacity and generalship was a sort of standing joke with the whole crew. The predictions as to the final outcome were many and varied, yet all unanimously agreed that his life in that business would be short.

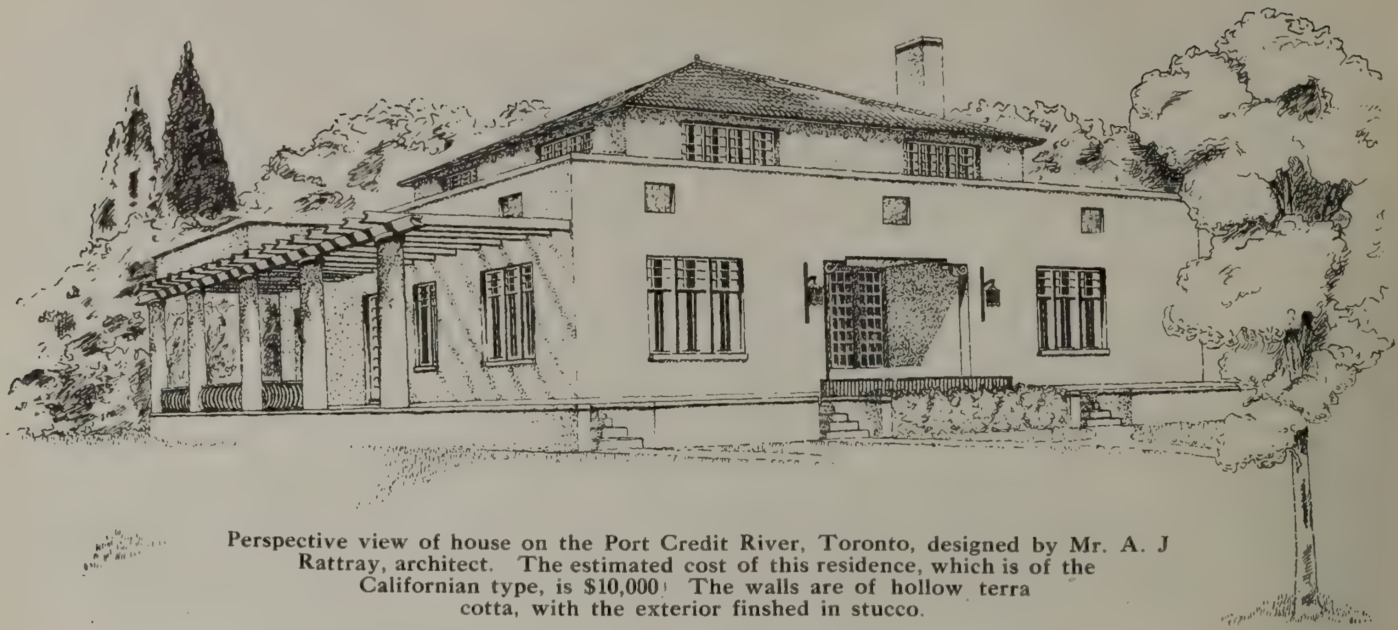
It was some time ago when the foregoing incidents took place, and it had practically been forgotten until an account of a business failure and an order from the courts to wind up the business of this plant brought the experience vividly to my mind. While my stay in that plant was a brief one, yet it was sufficiently long to prove that even small things contribute largely to a man's success or failure. No matter how large a business may be, the proprietor cannot well afford to ignore the necessity of even so small an item as files.

The proprietor's attitude in regard to supplies was an outstanding feature of the whole works, and it was plainly evident that the want of them cost a great deal more than the price of the supplies. While it is doubtless true that any old thing is better than nothing, yet in the wood-working business the best obtainable in the way of belting, files, etc.—in fact, all kinds of supplies—is by far the most economical in the end. The progressive, wide-awake manufacturer in this age of competition is the one who looks well after this end of the business.

Sawdust Briquettes

A new industry may be successfully combined with the planing mills—that of making of the sawdust briquettes to be used for firing under the boilers, thus considerably decreasing the cost of the fuel to the mill owner. This is being very advantageously done in Germany. The sawdust is automatically gathered and conveyed to a place near the presses. From here it is carried over a heated belt-conveyor to a drying-room. This is a cylindrical revolving drum about 2 feet in diameter and 20 feet long. In this drum the sawdust is partially dried, the pitch contained in the wood is softened, acting hereafter as a binder. From here the sawdust is conveyed over an incline to the after-dryer of the same shape as the first dryer, which forms a part of the press. Here it is submitted to a higher temperature to drive off all the moisture, and kept running forward toward the end of the after-dryer by rotating paddles. At the end of this after-dryer, the sawdust falls through an opening into the trough of the press, which is a simple angle-lever press. The drive is of the usual shafting belt type, the fixed pulley acting as a flywheel. At the end of each pressing operation, which takes place about 24 times a minute, a briquette is made about 5½ inches by 2⅞ inches by 1⅛ inch, weighing between one-half and three-quarters of a pound. From the press the briquettes are carried by another belt-conveyor to a cooling room and are then ready for use. As the installation is very cheap, costing in Germany only $24, it should recommend itself to the attention of sawmill owners, who could utilize to great advantage a heretofore mostly wasted product of their mills.

According to a special report of the U.S. Census Bureau machine woodworking gives employment to a greater number of wage earners than any other industry. During the census year it is stated that there was employed in the manufacture of lumber and other direct timber products an average of 695,019 wage earners. the largest number employed at any time being 739,160 in the month of November. The above figures do not include furniture factories, car shops and other woodworking industries.



Perspective view of house on the Port Credit River, Toronto, designed by Mr. A. J Rattray, architect. The estimated cost of this residence, which is of the Californian type, is $10,000. The walls are of hollow terra cotta, with the exterior finshed in stucco.

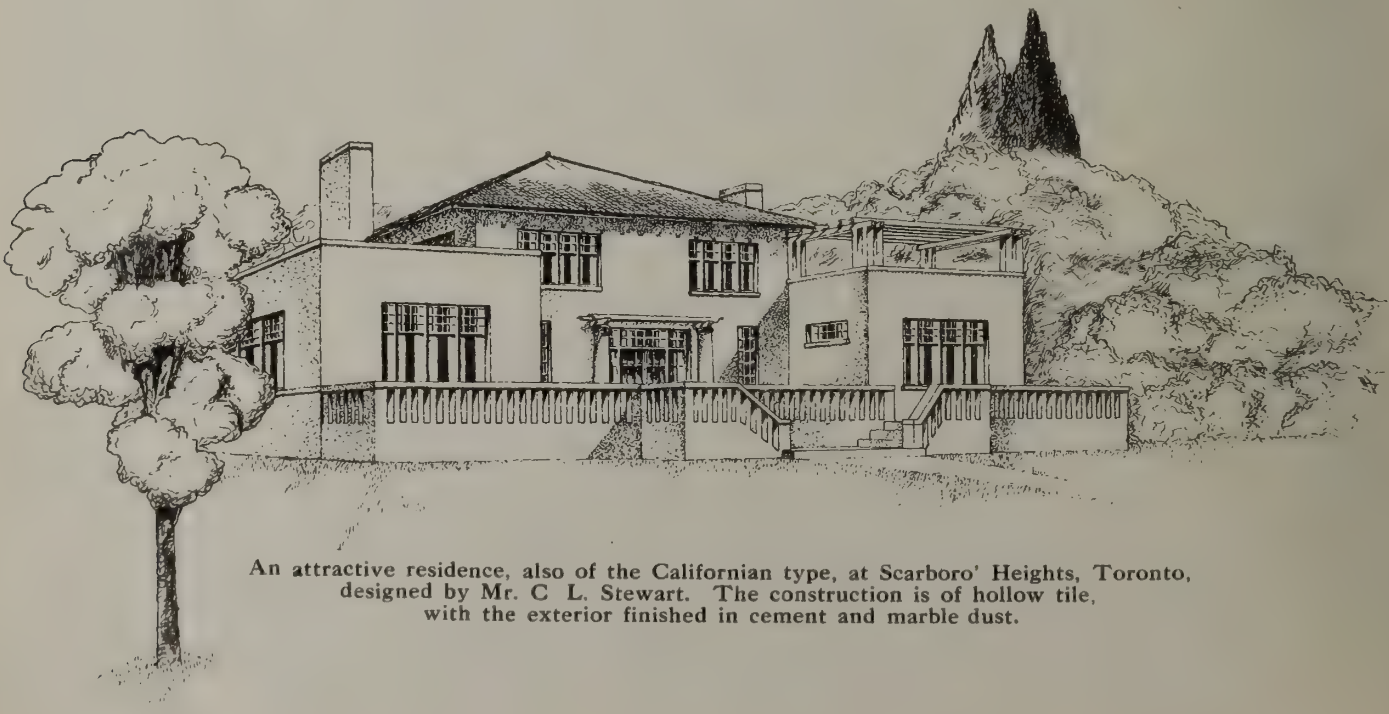
Attractive Residences of the Bungalow Type

WE reproduce herewith designs for two residences of the Californian type—one on the Credit River, designed by Mr. A. J. Rattray, and the other at Scarboro' Heights, designed by Mr. C. L. Stewart.

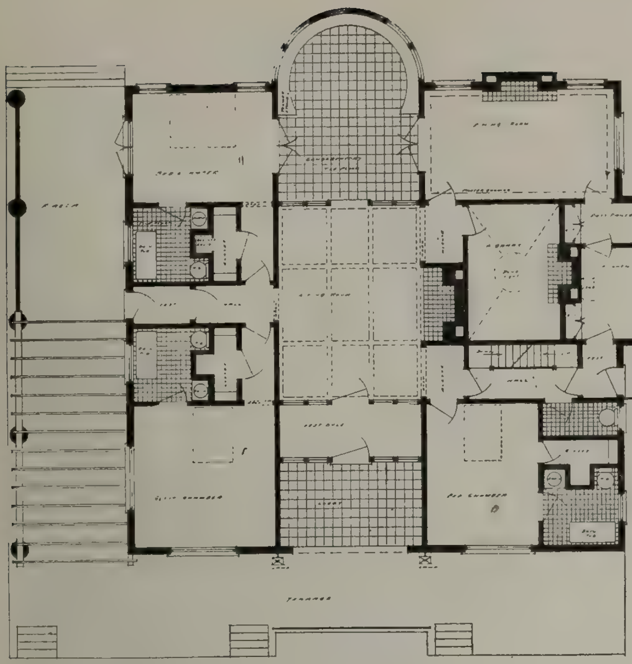
In the first named residence—that of Mr. Rattray's design—the walls are of hollow terra cotta, while the exterior will be finished in stucco, the structure resting on a concrete foundation. The woodwork entering into the residence is quarter-cut white oak. The house stands on a splendid site of about eight acres, the accessory conveniences including a boat house, garage, septic tanks, gas plant, etc. A feature of the accommodation of the house is that each bedroom has a separate bathroom, with tiled walls and floors. On the first floor there is the billiard room, where all the rafters are exposed and stained. On this floor also are two maids' rooms and a children's play room. The estimated cost of the residence alone is $10,000.

Residence at Scarboro' Heights

The general features of this residence, such as terraces, pergolas, etc., belong particularly to the Californian type. The construction is of hollow tile covered on the exterior with cement and marble dust, giving a pure white finish, which in the sunlight brings out a sharp contrast. The roof is of Spanish tile. The interior of the ground floor is arranged around the reception hall, giving easy access to every portion of the house. The hall itself, which is finished in fumed oak, is worthy of note. The spacious living room, in walnut, is beamed and panelled. The reception room



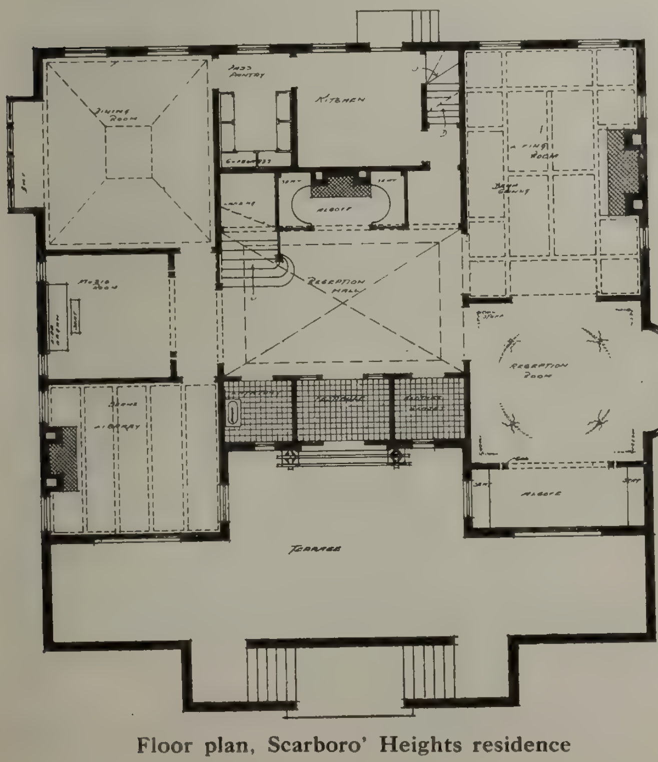
An attractive residence, also of the Californian type, at Scarboro' Heights, Toronto, designed by Mr. C L. Stewart. The construction is of hollow tile, with the exterior finished in cement and marble dust.



Floor plan, Port Credit River residence

is French grey with gold trimmings. The library and dining room are finished in mahogany and quartered oak respectively. The bedrooms, which are equipped with private baths, are all finished in white enamel, with mahogany doors.

It is significant of the prosperous conditions of trade now obtaining that in a densely populated city like Liverpool, Eng., where a fire occurred at the Relief Society's workshops in which unemployed men were put to work on the preparation of fire wood, practically no distress was occasioned for the reason that practically nobody was "employed." The manager of the Society stated that work was so easily obtained and that trade was in such a flourishing condition that few were employed in the building.



Floor plan, Scarboro' Heights residence

The Experiences of a Carpenter-Contractor

By Frank G. Myers, Fort Frances, Ont.

WHEN I started on my own account five years ago, I prided myself on being able to build a house with less lumber than most other carpenters. Now, I have gotten over that. It does not pay to skimp the size and quantity, if you don't want floors to spring and sag and roofs to spread, etc.

Also I put in more nails than I used to. Nails are cheap; don't skimp the nails. Also I used to put on building paper to keep out the wind. Now I have changed my ideas and build my walls to keep in the heat and keep out the cold. I always line my houses with ship lap or D. & M. stuff, outside and inside—paper and novelty siding outside, and paper and straps on the inside lining—then lath and plaster. I strap at 16 centers with lath.

By lining inside with inch boards, you can always put studs at 24-inch centers and so save a little dimension, and put the price into the inside lining.

First floor joists are 24-inch centers; I strap them with 1 by 2 and 16-inch centers. Attic joists coming on top of plate can be put 16-inch centers. Then I floor attics all over, right out to the rafter plate, to keep heat of bedrooms from evaporating through plaster ceiling.

We purchased a small combined rip, cross-cut and hand saw with 3-inch jointer. It is ball bearing and runs fine with two-horsepower motor. We have rigged up an emery on one corner and grind everything in sight. We even rasp up wood work on it and sharpen our pencils on it. We make a lot of storm windows, cutting our tenons on the rip, plugging out our mortises on a foot power. We have ripped up 6 by 6 timbers by turning them over and cutting 3 inches each time and resawed 8-inch boards on the rip and finished on the band saw. That little machine has paid for itself in six months.

I came to this town from Manitoba eighteen months ago; got my first contract and started in, determined to show what I could do. I have always made it a point to give my customers more than they bargained for and have never had to hunt work, for one satisfied customer is the best ad. a fellow can have. We built nineteen houses last summer in seven months; have also kept a man busy in the shop, and now we have enough to keep four men in the shop.

In the winter I usually draw plans for houses to be figured on in spring. I think the contractor who draws his own plans has a decided advantage over the man who cannot, or who has no taste for such work. He comes in personal contact with the prospective builder and makes the suggestions, and if he is up-to-date, as he should be, he can prove it by showing samples of the latest thing in paper, roofing, brick, mantels, painting and color schemes, floor varnish, etc.

I put in my first cabinet—dining to kitchen—for nothing to get the idea started. I put in three last summer as a result.

Don't be afraid to give something for nothing once in a while. People like to tell about it, and you will get it back sometime somehow.

I got sick of having painters come on after me on a job and spoil our nice lumber by covering the beautiful grain with a coat of some cheap dope or other to stain the wood. So I hired a good man myself and bought our paint and varnish wholesale. Got a good alcohol stain and had him put it on and rub off again to bring

out the beauty of the grain; then one coat liquid filler and one coat varnish make a very good finish.

We get a profit on the paint and a far better job than we did when sub-letting to painter contractors.

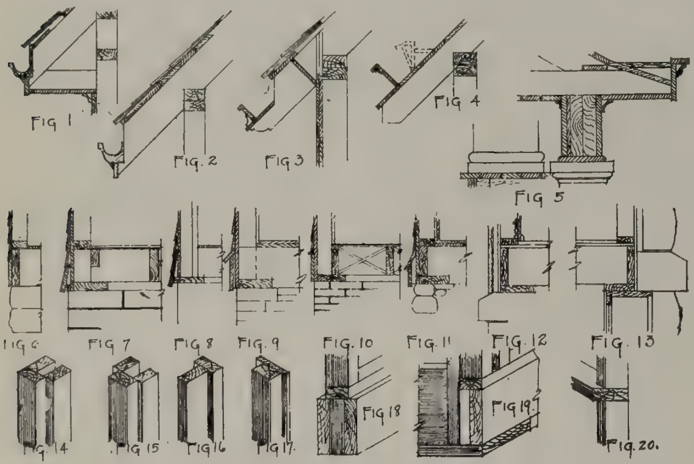
Our greatest trouble has been to get people to wait for their houses long enough to get the plaster dry; then they kick because the doors swell and won't work and the floors shrink, etc.

I always aim to work on the job myself and keep gang together. Start ten men on a frame house and hear people talk about how we push the work ahead and don't keep people waiting all summer for their houses.

Hints on House Building

IT is not my idea to tell all about how to build a house in this little article, I only intend to touch on the subject. Of course, the way to build a house is to construct it according to the architect's drawings, but, while that is the way the best houses are built, it often happens that the carpenter is called on to build without the much needed drawings.

Figure 1 shows the cornice and roof construction of a style in which, in the place of the metal gutter, there is a wooden eavestrough to carry the rain-water off, and in the case of a heavy snow sliding off the roof there is no danger of taking the gutter off with



Hints on House Building

it, as it is down out of the way. It makes quite a nice finish of the box cornice style.

Figure 2 is another somewhat similar type for the same purpose, but is more of the cheaper railroad cornice type.

Figure 3 is a very neat and simple style that will answer all the purposes of the others just mentioned, but is arranged for a tin or other metal gutter.

Figure 4 is the cheap kind that at one time was railroaded all over this country. The dotted lines show different styles of construction.

Figure 5. This porch cornice shows the old style box cornice that is still in use, and as it is one of the very best and most permanent styles will probably always be in style. There are too many built up and galvanized iron styles to try to think of mentioning them all.

Figure 6 shows a cheap foundation construction; note that the base for the bottom of the outside of the house is simply ship-lap.

Figure 7. Another cheap style, in which the base board is furred out to give a swell effect. A one by four is nailed to the studding to nail the ends of the flooring to, and in that way saves one joist.

Figure 9. Another cheap swell, yet a good practical style that is tight with nothing left to get wet and rot.

Figure 9 shows a better and more striking style of base. You will note that I have here shown six-inch flooring for lining on the wall as well as on the floor of the house, while the other linings shown before have been cheaper material.

Figure 10. A good permanent style that has stood the test for ages past and will undoubtedly stand for ages to come; looks well and is a good job if properly done.

Figure 11. Another practical type, of which there is no end.

Figure 12. Cement or plaster for outside finish. This shows metal lath. Some argued a few years ago that they were the thing, but as the metal rusts out it has become the opinion of many that wooden lath is the only thing for outside construction.

Figure 13 shows a frame wall with cement blocks for the outside finish, showing also the construction of the cellar window.

Figure 14 shows how three studding at the corner can be made to take the place of four, and in that way save one stud without materially hurting the building. Many carpenters use blocks in place of the third stud but unless they are well nailed they are not as good as the style shown.

Figure 15 shows the studding of the outside wall where there is a partition and Figure 16 is practically the same thing where the partition is set the other or flat way of the studding.

Figure 17 shows a cheap way to make a studding for the partition and is done by simply nailing a sheathing board on the back of the studding to form the corners to lath to.

Figure 18 shows the joists set apart so that the floor at each side of the partition will catch the ends of the flooring as well as support the partition.

Figure 19 is the general construction at the corner of the building, and makes a good, tight job.

Figure 20. A good style to save a joist at the end of the ceiling, which is simply using a plate two inches wider than the studding, to catch the ceiling lath, with a one by four to support the flooring ends.

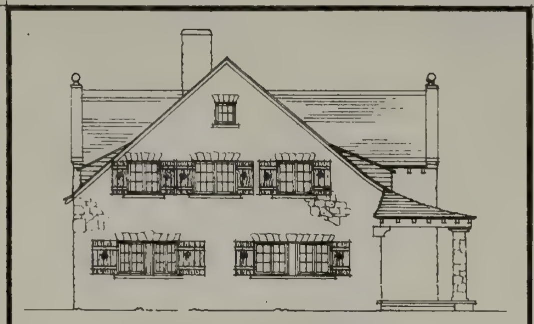
Thousands of wooden combs are made annually in the Philippine Islands and are a staple article on the market. The best grade is made out of the hard, heavy, fine-textured and very dark heartwood of "Philippine ebony" and the cheaper one from the grayish or reddish sapwood of the same species. Most of the combs are worn by native women. The process of making is very simple. The green wood is sawed into sections of convenient length and then split into thin tangential slabs. The latter are dried over a smoldering fire of sawdust held in an earthen vessel. The outline of the comb, usually curved at the back, is drawn in pencil on the slab, which is then clamped in a vice for sawing. The teeth are sawed out first and afterward the back of the comb is cut away. Polishing is done with sandpaper or rough leaves. While most of the combs are plain some are carved or engraved, the instruments used for the purpose being a sharp, pointed knife, a small graver's tool, or even a section of umbrella rib brought to a point.

The way to do fast work is first to do good work slowly and gradually increase the speed.

NORTH ELEVATION

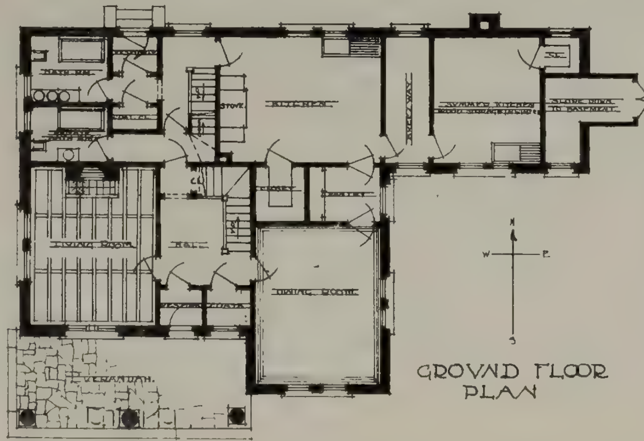
PERSPECTIVE

SOUTH ELEVATION

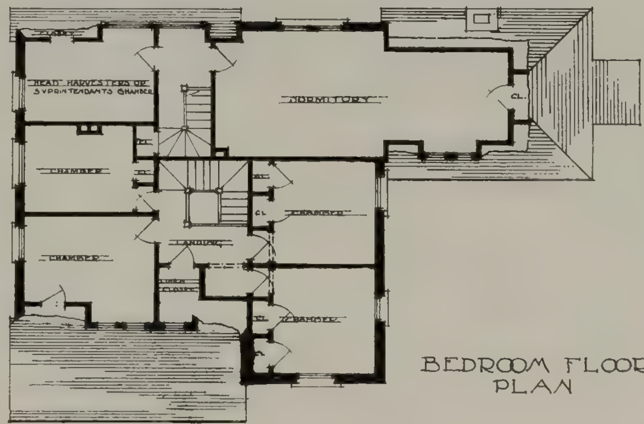


WEST ELEVATION

Design for Farm or Country House Estimated to Cost $4,500 to $5,000



GROUND FLOOR PLAN



BEDROOM FLOOR PLAN

Modern Manufacturing Methods Most Profitable

SOMEONE has said "Wise expenditure is true economy." A casual investigation shows that nowhere does the saying apply more forcibly than to the woodworking business.

There is a furniture factory in Chicago that has been located in the same spot for the last 35 years. They are close to the business part of the city and have every advantage for profitably marketing their product. In spite of this, they are to-day doing the same amount of business that they did 30 years ago, with the difference that their margin of profit to-day is not nearly as large as it was in the days gone by.

A visit to this plant would clearly show the reasons for this backwardness. The man at the head of the concern is a good workman, understands the manufacturing business fairly well, but is completely blind to the advantages of any up-to-date method.

Figuring for Fifteen Years

Thirty years ago he installed a Sander, in fact it was one of the first sanders ever built. That machine to-day stands in the same place as it did then. The Superintendent said that for the last 15 years the "old man" has been figuring on putting in a new Sander, but it seems that he cannot bring himself to the point of making the decision.

To-day he is working under a great disadvantage because his Sander, like most old machines, is small and it is necessary for him to sand in sections a great many of his wide tops before glueing. During a 10 hour day, the operator who is paid $3.50 per day, spends hours adjusting the worn-out drums and trying to keep them and other parts in alignment. In fact, this tool has spoiled the man's disposition and because he has given up hope of securing good results he has lost all pride in his work.

I mention the Sander because this is a machine that is used in most factories and will best explain my point. The other tools in this same plant are practically in the same condition as the Sander. In this factory I have seen cabinet makers using up many minutes of valuable time by sanding table tops by hand. The most wonderful thing about this company is that they are in business at all when you consider that most of their competitors are men who consider it a privilege to be informed of any new method that will tend to reduce their manufacturing cost.

Ultimately Compelled to Buy

If the manufacturer we are speaking about stays in business one year longer, he will be compelled to buy a new Sander because the old machine is absolutely racked to pieces. And it is no discredit to a sander or any other wood-working machine for that matter to be "out of whack" after thirty years of constant service. Nor is it to be wondered that the first type of sander built has been greatly improved in design and construction, made to do better work with less labor, in the last quarter of a century. It is the same progress that has taken place in all other lines. It is the same progress that enables wood-working machinery manufacturers to-day to build matchers that turn out better work at 250 ft. a minute than the old style machines did at 40, 50 and 60 feet a minute.

Keep Pace With Progress

The trouble with our friend is, he has not kept pace with the march of progress. If he had installed a new sander 10 years ago and had the use of it and other up-to-date equipment all these years it is safe to say that his business would have been many times as large as it is at the present time.

When times were good this manufacturer used to turn down many orders simply because he did not have the equipment to take care of them, the result was that he worked along at about the same gait whether times were good or bad.

Once the Superintendent made him see a ray of light. He told him that in order to keep up with the times he should advertise. He thought this over for a couple of years and one day put an add in a trade paper; the result was a number of good inquiries. When he received these he was "up in the air," as he had no catalog or photographs of any of his line to send out, he quit advertising, said it was a "humbug."

Some years ago this same manufacturer invested several hundred dollars in real estate. Since then he has not received one-tenth the return from his land that he would have received had he invested in modern machinery and developed his business. He invested in land because he was sure it would not wear out, that it would always be there. He would not invest in modern machinery because he knew it would wear out some day but he never stopped to consider that his investment was not for so much iron and steel but for what a machine would do for him and the returns it would bring.

It seems like telling tales out of school to "tell on this man," but as he seldom reads technical journals of any kind there is little danger of him seeing this. If by any chance he could it might have the effect of "opening his eyes."

A Comparison

Contrast now, the course of the above manufacturer with one of the largest door manufacturing concerns. They started up about twenty years ago on just as small a scale as our friend, with the difference that they were thoroughly alive and always ready to consider any proposition that would improve the quality of their product and decrease manufacturing cost.

A few years ago they had in operation several triple drum sanders of late design. They had only been installed in their plant a short time when a new type of sander especially adapted to their work was built and put upon the market. This was the six-drum sander, that sands both sides of stock, like doors and sash, in one operation with the same labor cost required to operate one triple drum sander. When they found that this new machine would sand 100 doors per hour on both sides, they compared it with the amount of work done on a triple drum which was 30 doors sanded on two sides. The saving the six-drum sander would net them in labor, floor space, power, etc., was apparent and they immediately adopted the six-drum sander method of sanding their doors. Like opportunities for saving on cost exist in other branches of the woodworking field.

A great fallacy that is frequently advanced by a woodworking manufacturer as an argument against the installation of a certain type of modern efficient machine is that he has not sufficient out-put to warrant the investment—investment is the word. It is a matter of fact that there is many a modern machine that would not require to work more than a hour or an hour and a half each day to return the user 10 per cent. yearly for depreciation and 6 per cent. for interest on his investment. The trouble is, we are all too prone to follow in the old beaten path until necessity, that mother of new methods, often compels us to alter the even tenor of our way.—Berlin Quality.

The Furniture Exhibition at Berlin

Exhibits Representative of the Best Canadian Work—Many New Lines Shown—Improved Transportation Facilities Urged Strongly

REPRESENTATIVES of the furniture industry from Halifax to Vancouver attended the second annual furniture exhibition held last month under the auspices of the Berlin and Waterloo manufacturers. Over two hundred manufacturers, dealers and travellers attended the meeting and it was generally conceded that the exhibition was an unqualified success. There were buyers from far and near and practically every exhibitor expressed satisfaction at the volume of business transacted and the new connections made. The following is a partial list of the buyers for some of the larger houses: R Breckenridge, Owen Sound; L. Yollas, Toronto; W. T. Turner, Toronto; Lew Phippen, Sarnia; E. J. Coles, Woodstock; Messrs. Luke and Abbott, of Wright's Hamilton; R. Johnson, Hamilton; B. Luke, Oshawa; J. G. Luke, Hamilton; S. Luke, St. Catharines; J. Lappin, of Goodwin's, Montreal; J. Ferrier, Weyburn, Sask.; J. Tanney, Winnipeg; H. A. Wightman, Fort William; Supt. Leach of the Hudson Bay Co.; J. Struthers, Guelph; C. Austen, Chatham, C. F. Trout, Woodstock; A. Werlich, Preston; A. Stager, Hespeler; W. Tomlin, Toronto; F. Goodwin, St. Thomas; Mr. Keene, of the Ontario Co., London, and others.

The Exhibitors

An enumeration in detail of the various exhibitors would take up too much space, but we cannot refrain from mentioning a few of the many firms.

The Kensington Furniture Company, of Goderich, had an exhibit in charge of J. A. Rumball, J. M. Adams and S. R. McCully. The lines shown were bedroom suites in the various grades and buffets in all finishes.

The Lippert Furniture Company had a display that attracted much attention. This comprised practically everything in household furniture and included many exclusive designs and patterns. Easy chairs occupied a prominent part in the exhibit. On one of these lines the firm has the exclusive manufacturing right.

J. Kreiner & Company showed tables, desks, book-cases and furniture in excellent variety.

The Walker Bin & Store Fixture Company exhibited fixtures for the hardware, dry goods and grocery stores. This firm has secured the Canadian rights for the Walker bins. Office desks are a line which the firm has recently added to its products.

Baetz Bros. had a good display of furniture in various finishes—fumed oak, golden oak, mahogany, etc. Dining room and parlor suites were the firm's specialty.

The Wunder Furniture Manufacturing Company showed the better lines of hall and parlor furniture and dining room chairs which are its specialty. Some of the finest pieces were those in fumed and golden oak, one of the best products seen was the leather upholstered parlor suites.

The Anthes Furniture Company showed a number of high grade products. Their principal line of manufacture are dining room and bedroom suites, of which they have a wide range.

The H. Krug Furniture Company had a large display in their exhibition rooms at their own factory. This firm specializes in the manufacture of office chairs, for which it finds an excellent demand all over the Dominion.

The D. Hibner Furniture Company was another factory exhibitor. This large industry makes a number of important lines, chief among which is dining room furniture. Mission furniture receives careful attention from this firm.

The Geo. J. Lippert Table Company, Limited, one of the largest manufacturers of dining room tables in Canada, showed a comprehensive line of pedestal dining room tables in plain quartered oak.

The Berlin Furniture Company had an excellent display at their factory. Their American black walnut bedroom suites attracted much attention this year.

The Globe Furniture Company, of Waterloo, had an excellent exhibit at the Market Building. This consisted of desks, office furniture, opera chairs and church furniture.

The Schierholtz Furniture Company, of New Hamburg, occupied a prominent position among the exhibitors of suites of mission furniture.

The Crown Furniture Company's display of bedroom furniture was in charge of Mr. A. Moss. Mr. Moss, by the way, is a military man of long service, and a veteran of the South African war.

The Banquet

The exhibition was brought to a close by a banquet at Masonic Hall. The excellent addresses were interspersed with musical items and recitations. Mr. Geo. C. Lang, president of the Employers' Association, acted as chairman, and the delegates were welcomed by the mayor, Mr. W. D. Euler, who paid many tributes to the importance and development of the furniture manufacturing industry. The history of Berlin, said the mayor, had been the history of the furniture industry, and vice versa.

During the evening it was strongly urged that an effort should be made to secure improved transportation facilities for the furniture trade between Ontario and Western Canada.

Those who registered were:

Jas. Fowler, Toronto; M. Honderieth, Milverton; D. S. Wilhelm, New Hamburg; Wm. Atters, London; R. A. Breckenridge, Owen Sound; F. Trace, Toronto; A. F. Stub, Forest; E. A. Poth, New Dundee; F. G. Groom, Waterloo; E. Kelly, Hamilton; W. J. Lindsay, Woodstock; H. Bottoms, Woodstock; J. Abbott, Toronto; A. K. Dunke, Toronto; Frank Goodwin, St. Thomas; D. L. Shafer, St. Thomas; F. E. Coombe, Kincardine; J. Button, Lucknow; N. J. Johnston, Kenmore; A. E. Sanders, Toledo, Ohio; G. H. Brett, Dunnville, F. G. Rumball, London; N. J. Boyce, Mitchell; A. D. Millar; W. Smith, Montreal; C. F. Traut, Woodstock; N. H. Waterloo; Frank O. Cundill, Hamilton; John Leslie, Winnipeg; Geo. Honsberger, W. L. Edmonds, G. W. Wrigley, E. A. Forson, of the Furniture World, Toronto; A. E. Evans, Toronto; John McCannon, Paris; J. C. Hunt, Dorchester; P. G. Ruppel, Galt; R. Torrance, Galt; John K. Gilmour, Winnipeg; G. A. Gruetzner, Hanover; Theo. Buck, Hespeler; S. S. Nash, Chesley; W. A. Luke, Oshawa; G. O. Luke, Hamilton; D. E. Statters, Chesley; M. F. Anthes, Montreal; W. H. Benny, Toronto; A. H. Bailett, L. Fallis, Toronto; J. Cohn, Toronto; L. Kelley, Hamilton; W. J. Nash, Hamilton; E. Bagshaw, A. E. Everett, St. John, N.B.; A. E. Gazlay, Toronto; E. C. Budge, Montreal; C. R. Woodman, Ottawa; J. A. Congell, Toronto; W. L. Jenning, Fredericton, N.B.; J. A. McLaughlin, Toronto; A. Moss, Preston; R. Magellusay, Preston; G. W. Jones, Preston; A. E. Craig, Toronto; H. H. Wightman, Fort William; A. M. Tanney, Winnipeg; Geo. H. McDonald, Winnipeg; J. W. Dare, Hamilton ;Bruce Leavens, Vancouver, B.C.; J. B. Roebincke, Midland; Edgar Roberts,

Winnipeg; T. Carcadden, Man.; Wm. Goudy, Welland; J. S. Lanigan, Halifax, N.S.; P. A. Sommerville, Hamilton; J. B. Snider, M. E. Braendle and H. F. Becker, Waterloo, Que.; N. J. Persores, Sarnia; A. Black, Orillia; C. J. Heaslip, Hagersville; T. R. Pearson, St. Thomas; Joseph Brophey, Goderich; W. J. Paratan, Goderich; J. E. Sussex, London; F. R. Puetby, Toronto; T. Carle, Toronto; A. H. Snyder, Waterloo; W. E. Cassidy, Toronto; C. Coryell, Toronto; C. F. Ott, Waterloo; H. G. Walker, Peterboro; J. A. Mundell, Elora; Julius Knauff, H. M. Snyder, H. M. Tonlin, Toronto; W. J. Lake, St. Catharines; G. H. Rundall, Merlin; A. Irving, Ottawa; Wm Buchanan, Orillia; A. T. Roberts, Toronto; Percy E. Brown, Toronto; Wm. Comstock, Peterboro; A. Roberts, Toronto; R. W. Higginbottom, Toronto; M. J. Brown, London; E. Schierholtz, Toronto; A. F. Mills, Regina, Sask.; A. T. Edward, London; A. Keene, London; S. Thompson, Guelph; C. P. Eastman, Vancouver; H. F. Rapp, Stratford; J. S. Henderson.

From Berlin

F. Kriener, A. G. Schreiter, C. A. Richardson, H. A. Lippert, R. S. Porteous, W. D. Euler, Mayor; J. A. Hallman, H. T. Krug, Geo. H. Hachborn, Chas. Adloff, C. Washburn, Geo. H. Lang, W. T. Sass, H. Ford, Philip Gies, J. S. Shantz, E. O. Weber, C. E. Werner, C. H. Mills, M.P.P., A. Schreiter, Harvey Krug, M. Wunder, J. C. Breithaupt, T. A. Witzel, A. L. Hixon, L. A. Galloway, L. R. Clemens, W. O. Winterhalt, J. W. Bailey, N. T. May, R. Krug, Wm. May, C. J. Baetz, J. H. Baetz, O. A. Keffer, M. H. Montag, P. M. Inglis, O. Kinzie, W. H. Grotz, R. W. Krug.

Trade Happenings and Opportunities

Woodworking News From Coast to Coast

The plant of the Lucknow Furniture Company, of Lucknow, Ont., was damaged by fire recently.

The Sackville Woodworkers Limited, Sackville, N.B., are offering their factory and plant for sale.

The Dominion Taxicab Company, Limited, Vancouver, has been incorporated with a capital of $10,000.

A fire occurred recently at the saw mill of Mr. E. Girard, Moreau street, Montreal, causing only slight damage.

The Walsh Sash & Door Company, New Westminster, capitalized at $100,000, has secured certificate of incorporation.

A. P. Ebert, Wiarton, Ont., has sold his mill to P. J. Bachelor, of Widdifield, Ont., who intends to operate it this year.

On February 6th a destructive blaze occurred at the North Vancouver Home Furnishers' Store, North Vancouver.

The Mason & Risch Piano Company have secured a permit to erect a $10,000 factory at 264 King street west, Toronto.

The new mill of the E. H. Heaps Lumber Company, at Ruskin, B.C., is ready to cut. It will be operated by means of electricity.

Oscar C. Teal is erecting a planing mill to cost $8,000, at Bridgeburg, Ont., and also a planing mill to cost $8,000, at Amigari, Ont.

The Gerhard Heintzman Company has taken out a permit for a five-storey brick factory at Sherbourne street, Toronto, to cost $25,000.

Mr. Geo. D. Little, of Woodstock, Ont., who was formerly engaged in the furniture business in that town, died recently at the age of 75 years.

The mill of the Saw Mills Owners Sales Company, Limited, at Belladune, N.B., has been burned out. It was a new winter mill, which had just been built.

Daniel Baird, Station street, St. Marys, Ont., is erecting an addition to his planing mill for which he will require new woodworking machinery, saws, planers, etc.

J. J. Blachford, of Hamilton, Ont., for several years manager of the Toronto branch of the old Semmens & Evel Casket Company, died last month at Hamilton.

Mr. R. C. Eckert, 434 Queens aveune, London, Ont., is interested in a syndicate which has purchased a site for a furniture factory at London, Ont., adjoining another factory which they contemplate purchasing. They will require machinery and equipment for manufacturing furniture.

Mountain Pine Agencies, Limited, is a new Cranbrook, B.C., concern incorporated to deal in lumber and manufactured products and to operate saw and planing mills.

The Empire Furniture & Bedding Company, New Westminster, B.C., is being taken over by the Westminster Furniture Company, Limited, which is capitalized at $25,000.

The Westport Woodworking Company, Limited, Westport, Ont., has been organized by W. C. Whitcher and others. The capital is $40,000 and the head office will be at Westport.

The Ontario Office Supply Company, of Ottawa, Ont., has obtained a charter with a capital of $50,000. The provisional directors are G. F. Perley, A. R. Dawson and R. W. Dawson.

Milverton, Ont., has secured a new industry in the H. E. Furniture Company, Limited, capitalized at $40,000, of which C. R. Honderich, J. H. Eydt and others are named as the incorporators.

The Expanse Lumber Company, North Bay, Ont., are considering the purchase of sawmill machinery for use at Haileybury, Ont. Information may be obtained at the North Bay office.

The McLaren Lumber Company, Limited, have been granted a Dominion charter to carry on business as manufacturers of lumber, with head office at Toronto, and capital stock of $1,250,000.

The Crossing Lumber Company, Limited, Frank R. Patriarche, Kinaki, Ont., managing director, are contemplating the erection of a sawmill. Construction is expected to commence next fall.

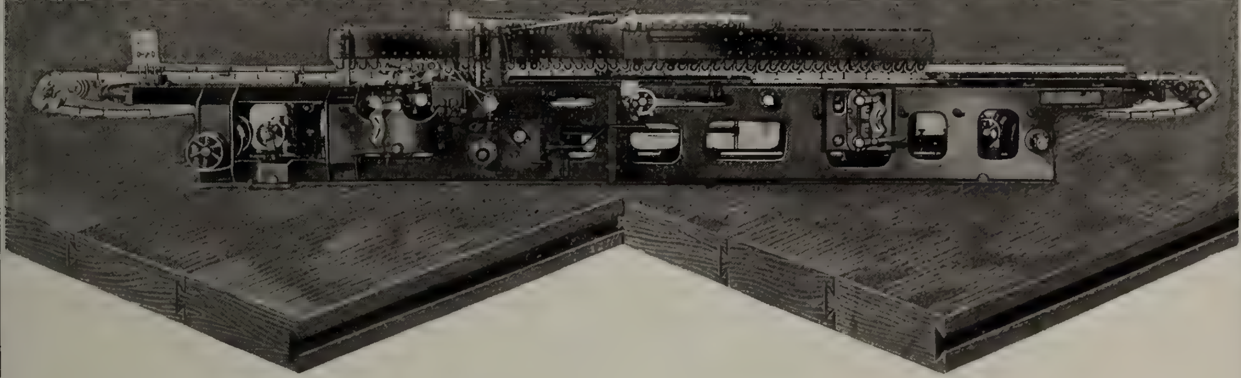
Amherst Pianos, Limited, is a noteworthy incorporation at Amherst, N.S. The incorporators named include R. H. Murray, J. L. MacKinnon and others. The new concern is capitalized at $500,000.

The Westport Woodworking Company, Limited, has been incorporated with a capital of $40,000, to manufacture and deal in timber, lumber, and all kinds of wood products, with head office at Westport, Ont.

Messrs. Duncan & Arnott are building a new sash and door factory at Grandview, Vancouver, B.C. Building operations are being rushed in order to get the factory in readiness to meet the demand of the spring builders.

The planing mill which is being erected by Reitzel Bros.,

LINDERMAN
AUTOMATIC DOVETAIL GLUE JOINTER



Found $5300.00

waste in cutting up, jointing and glueing departments

A General Manager and the Superintendent of a prominent Canadian Furniture Concern last April figured that they were losing $5300.00 that could be saved should they install a Linderman Dovetailer, and at the April meeting of their Board of Directors submitted figures showing where the loss occurred.

In December, after having the machine in operation over six months, the General Manager brought out the same estimate sheet that was submitted to the Board of Directors six months previous and proved from his cost figures that his estimate had been correct.

In the six months just ended their figures showed that they had consumed:—

3500 lbs. of glue less than during the previous six months.

Five men had been taken from the ripping, jointing and glueing departments and sent into other parts of the factory.

Over 50,000 feet of lumber had been saved.

These figures were given to us voluntarily as an actual fact, and the General Manager then stated "We expect next year to build a factory to double our output, when we will install a second machine."

One week previous to this conversation, the General Manager of another furniture factory, who had had a Linderman machine in operation since August stated that his cost figures showed he was making a saving of at least $10.00 each working day; that they would save at least 75,000 feet of lumber a year; the labor of three men, and fully sixty per cent. of their glue bills.

Besides the actual money saving there is a further saving which cannot be estimated in dollars and cents. What would be your output loss if you had to sand every piece by hand instead of by machinery? What is your gain in output by being able to glue up practically every piece by machinery instead of by hand, and to know that at the end of each day's run practically all the stock that has been cut up has been glued and is ready to move on the next morning through the machine departments?

May we not be permitted to investigate your conditions and tell you approximately what we can save for you?

Canadian Linderman Co., Ltd.

—— Works at ——

Muskegon, Mich. Woodstock, Ont.

Foundry street, Waterloo, Ont., costing $20,000, will be one storey high, 126 feet by 66 feet, with cement foundation, reinforced concrete construction and pine floors.

N. Labrie's sawmill at St. Charles, Que., was recently destroyed by fire at a loss of about $12,000, partly covered by insurance. Mr. Labrie will rebuild. He will be in the market for machinery, steam plant, water wheels, etc.

In the New Brunswick field we note the incorporation of the Moncton Woodworking Company, Limited, Sunny Brae, N.B., capitalized at $30,000. The incorporators include F. C. Robinson and S. O. Humphrey, both of Moncton.

A factory for the making of baskets will be erected at Grimsby, Ont., by Arthur Hewson, care Grimsby Manufacturing Company. Mr. Hewson will be in the market for the latest machinery for the manufacture of all kinds of baskets.

The Evel Casket Company, Limited, has obtained a charter to manufacture and deal in caskets, coffins, etc. The firm is capitalized at $100,000, and the head office will be at Hamilton. P. J. Evel, W. G. Evel and H. B. Evel are among the incorporators.

R. Truax & Son are having plans prepared for the erection of a one storey sash and door factory, 150 feet by 90 feet, with cement foundations and white brick construction. They will be in the market for general machinery. The cost of the plant will be $7,000.

Another addition to the piano manufacturing companies is the newly incorporated Blundall Piano Company, Limited, Toronto, capitalized at $100,000. The incorporators are E. Blundall, C. C. Peppiatt, E. Peppiatt, Stewart Sinn and Edward Burgess, all of Toronto.

The Royal City Lumber & Shingle Company, Limited, capitalized at $50,000, has obtained a charter. The head office of the company is at New Westminster, B.C. They will acquire the business of the British Columbia Mills Timber & Trading Company.

The planing mill of Wm Robinson, at Selkirk, Man., was damaged by fire on the evening of February 3rd to the extent of $5,000. The mill was closed down afterwards for the purpose of substituting electric motors for steam power and will probably be rebuilt at once.

A charter has been granted to the Shaughnessy Manufacturing Company, Limited, Vancouver, capitalized at $25,000. The company will carry on the business of manufacturing and dealing in doors, sash, dressed and rough lumber and wood products of all kinds.

Guhr & Company, Limited, a New Westminster concern that has just been incorporated with a capital of $25,000, will acquire the departmental store business of A. C. Guhr & Company. They will carry on a furniture manufacturing business in one of their departments.

Ninety minutes from the time the J. M. Bateson woodworking plant at Calgary was discovered to be on fire last month the building and its contents were reduced to ashes. The structure was of wood, and filled from top to bottom with inflammable material. The loss is estimated by the owner to be about $60,000, fully covered by insurance.

The Thompson Kanuck-Kitchen-Kabinet Company, Ltd., has been incorporated with a capital of $85,000 to manufacture and deal in timber and all wood products and carry on business as sawmill proprietors, timber growers and merchants, etc., with head office at Belleville. The provisional directors are J. C. Knowles, H. T. Burton and Wm. Kirby, accountants, all of Toronto.

St. Thomas, Ont., was the scene of a big fire on February 6th. The flames broke out at the Baldwin-Robinson Company's furniture store, which was completely gutted. The adjoining structures were also badly damaged, the total loss being estimated at $150,000. The Baldwin-Robinson Company carried an extensive stock of pianos and furniture worth about $100,000, which was entirely destroyed.

Plans for additions to their present mill in Saskatoon are now being prepared by Cushing Bros. The capacity of their present accommodation will be doubled. The new building will be built on to the end of the present building, and will be of brick and cost approximately about $25,000. It is the intention of the company to just double their number of benches. The sash and door department will be extended along the ground floor, and the glazing room on the top. The basement of the new building will be utilised as additional store room. At the present time the company are employing about 75 men. The size of the new building will be about 50 by 100 feet.

The British America Mill & Timber Company has moved its head office from Winnipeg to Vancouver, J. E. Dougherty is the general manager, and J. D. Robinson, his assistant. R. J. Crawford, who has been in charge for several years at Vancouver, will continue with the company as purchasing agent. The object of the move is to get closer to the source of supply of lumber.

The Canadian Linderman Company, Limited, Woodstock, Ont., have sent to this paper a sample of a very handsome pin tray of polished hardwood which they are distributing among woodworking plants of Canada. These pin trays were made from small strips of waste wood at the plant of the Paine Lumber Company, Oshkosh, Wis., manufacturers of the famous "Korelock" doors. They have eleven Linderman machines in their plant. The pin trays have been splendidly executed. The hollow rounded centre section of the tray clearly shows that a Linderman joint can be cut at any angle and show a perfect joint. The pin tray is a fine and unique sample of workmanship.

The sawmill at Lethbridge, Alta., which was recently constructed to convert old C. P. R. bridge timber into lumber, has commenced operations. A large amount of timber was floated down the river last summer and there are now 2,000,000 feet on the ground. This will probably keep the mill in operation until the remainder can be brought down during the spring and early summer. There are 4,000,000 feet still to be brought down the river. A large portion of the timber is excellent British Columbia pine, cedar and fir, which, having been well seasoned in use, ought to make a very desirable class of lumber, etc. The pine and cedar will be manufactured into shingles, a shingle mill having been installed in connection with the plant, which also includes machinery for dressing, edging and moulding.

Cliff Bros., New Westminster, B.C., have purchased the British Columbia box factory at the eastern point of Lulu Island. M. J. McDonald, former manager of the British Columbia Lumber Company's mill on Lulu Island, is associated with the Cliff Bros. in the transaction. The company contemplates the erection of a complete plant, including a sawmill, box factory and shingle mill in or near New Westminster, at a cost of $75,000. In the meanwhile they will continue to operate the old plant on Lulu Island.

The furniture warehouse of Mr. A. Paul, of Fort William, Ont., was destroyed by fire last month. The loss entailed was $11,000. The fire occurred in bitterly cold weather, which made the work of the firemen very hard. The men handling one of the nozzles used in protecting an adjoining building had their hands frozen to the holds and it was necessary to thaw their mittens in order to release them.

The Westminster Woodworking Company, New Westminster, B.C., have commenced operations on their new plant in Queensborough. Five years ago Mr. James Brooks started a small plant on Columbia and Eleventh streets, where he employed at first but one man. The business has grown,

however, until requiring more space and a larger plant, Mr. Brooks decided to move to Queensborough, where he obtained three acres of land, and he nows employs nearly fifty men. The whole plant, including the buildings, were designed and erected under the direct supervision of Mr. Brooks, and involves an expenditure of nearly $50,000. The main factory consists of a basement and two floors, 150 feet by 80 feet, with fourteen foot ceilings. All modern machinery has been installed.

According to a despatch from New Westminster, B.C. Messrs. Temple and Roland Cliff, who recently disposed of their interests in the can factory in East Burnaby, and Mr. J. H. McDonald, late manager of the British Canadian Lumber Company, have purchased the controlling interest in the old B. C. Manufacturing Company on Lulu Island, and will at once erect a complete sawmill, shingle mill and box factory at a cost of $75,000. The B. C. Manufacturing Company has been organized into a limited company and will operate the old B. C. box factory until a new plant is erected. All kinds of boxes will be turned out, but the principal output will be salmon case and fruit boxes. The new plant will be located in the vicinity of New Westminster and not on Lulu Island

Dominion Sawmills Company Re-organized

The receivers, managers and the liquidator of the Dominion Sawmills and Lumber Company, Limited, announce that the following have been appointed as the board of Forest Mills of British Columbia, Limited, successors to the business heretofore carried on by the former corporation:—Messrs. J. M. Savage, of Victoria, chairman; R. S. Lennie, barrister; W. J. Blake Wilson, T. Frank Patterson, all of Vancouver, and W. A. Anstie, of Calgary.

Mr. Anstie will occupy the position of executive agent of the board with headquarters in Vancouver. The receivers express their appreciation of the support accorded them during the period of their management of the business which has now terminated.

The Forest Mills of British Columbia, Limited, owns extensive timber tracts in the interior in proximity to its five sawmills located at Three Valley, Taft, Comaplix, Cascade and Nelson respectively, as well as an organization for selling the output in the local and prairie markets.

Motor-Operated Drills

A piece of apparatus which is winning its way very quickly into all kinds of factories, work shops, etc., is the motor-operated electric drill. One of the most satisfactory types is that manufactured by the Van Dorn & Dutton Company, the Canadian agency for which is held by Mr. A. Ross Oborne. The popularity of this particular type of drill is shown by the fact that between 400 and 500 of them have been sold in Canada during the past year, the purchasers including the names of most of the wood and metal working factories, bridge works, railway shops, piano works, and electrical contractors. The electrical contractor has found this apparatus a very valuable adjunct in placing his wires where walls or floors or beams or any other obstruction has to be pierced. In this case the ordinary auger attached to the electric drive does the work quickly and neatly. During the last few days an order has been received from the Office Specialty Company requiring the supply of one drill to each of the ten branches of this company. Much of the success of this particular drill is due to the fact that it is made to stand hard service and that it is equipped with what is known as the "universal" motor, which means that it will operate on either direct or alternating current.

WOODWORKING MACHINERY

More than 1,000 Second-hand Machines, Renewed and Guaranteed.

Section of main floor Exhibit and Salesrooms

52 Lines of New Machinery the Largest Stock in the World.

CHICAGO MACHINERY EXCHANGE, Inc., 1219-1227 Washington Bv'd. CHICAGO, Ill., U. S. A.

National Veneer & Lumber Co.

Manufacturers of

Quartered Oak Veneer

West Michigan Street and Belt Railroad,

INDIANAPOLIS, IND.

"Pioneer" Moulding Sander Power Veneer Presses

Cabinet Clamp

Veneer Press

Write for Catalogue and Prices

Chain Clamp

Black Bros. Machinery Co.

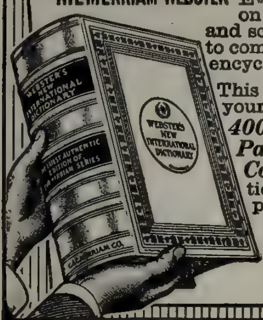
Mendota, Ill.

Column Clamp

"Just the Information We Need"

WEBSTER'S NEW INTERNATIONAL

—THE MERRIAM WEBSTER



Every day in your talk and reading, on the street car, in the office, shop, and school some new question is sure to come up. You seek quick, accurate, encyclopedic, up-to-date information.

This NEW CREATION will answer *all* your questions with *final* authority. *400,000 Words Defined. 2700 Pages. 6000 Illustrations. Cost $400,000.* The *only* dictionary with the new divided page. A "Stroke of Genius."

Write for specimen pages, FREE.

G. & C. MERRIAM CO.,
SPRINGFIELD, MASS.

Should be Investigated

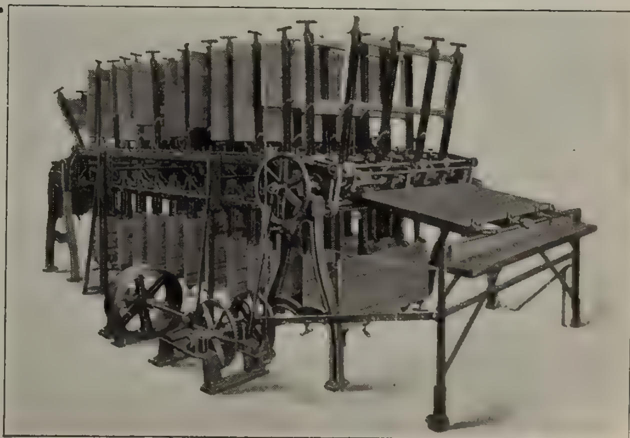
The advantages, conveniences and good points of this machine should be investigated by modern wood-working establishments.

The Billstrom Automatic Glue Clamp Carrier

modernizes the glue department thoroughly. The many dollars lost in the average glue room will help pay for this machine. One user said he would not be without it for many times its cost. Facts with complete particulars and description will help your investigation.

We have over 170 machines in operation.

Nels J. Billstrom, 1315 Tenth St., Rockford, Ill.



BUYER'S DIRECTORY

AUTOMATIC DOVETAIL GLUE JOINTER
Canadian Linderman Machine Co., Ltd., Woodstock, Ont.

AUTOMATIC GLUE CLAMP CARRIER
Nels J. Billstrom, 1315 Tenth street, Rockford, Ill.

BABBITT METALS
Shurly Dietrich Co., Ltd., Galt, Ont.
Fay & Egan Co., Cincinnati, O.
Canada Metal Co., Ltd., Toronto.

BALUSTER LATHES
C. Mattison Machine Works, Beliot, Wis.
Thos. White & Sons, Paisley, Scotland.
Chicago Machinery Exchange, Chicago, Ill.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.
Canada Machinery Corp., Ltd., Galt, Ont.

BAND SAW FILING MACHINERY
Shurly Dietrich Co., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

BAND SAWS
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Shurly Dietrich Co., Ltd., Galt, Ont.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
R. H. Smith Co., Ltd., St. Catharines, Ont.

BAND SAW MACHINERY
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
H. W. Petrie, Ltd., Toronto.

BAND SAW MILLS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., Cincinnati, Ohio.

BAND SAW STRETCHERS
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

BENDING MACHINES
Fay & Egan Co., Cincinnati, Ohio.

BELTING
J. A. Fay & Egan Co., Cincinnati, Ohio.
Sadler & Haworth, Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
H. W. Petrie, Ltd., Toronto.

BELTS (Endless)
Candada Machinery Agency, Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Sadler & Haworth, Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
H. W. Petrie, Ltd., Toronto.

BELT CEMENT
Sadler & Haworth, Montreal.

BELT FASTENERS
Sadler & Haworth, Montreal.

BELT DRESSING
Sadler & Haworth, Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

BLOWERS
Sheldons Limited, Galt, Ont.
H. W. Petrie, Ltd., Toronto.

BLOW PIPING
Sheldons Limited, Galt, Ont.

BOILERS
Canada Machinery Agency, Montreal.
H. W. Petrie, Limited, Toronto.

BORING MACHINES
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Mussens, Limited, Montreal.
J. M. Nash, Milwaukee, Wis.
Valley City Machine Works, Grand Rapids. Mich.
H. W. Petrie, Limited, Toronto.

BOX MAKERS' MACHINERY
Canadian Linderman Co., Ltd.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.

BROKEN CASTINGS BRAZED—MACHINIST AND DIE MAKER
W. H. Dunne, 1492 Queen St. West, Toronto.

CABINET PLANERS
Canada Machinery Corporation, Ltd., Galt, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Agency, Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Valley City Machine Works, Grand Rapids, Mich.
Baxter D. Whitney & Son, Wichendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Ltd., Toronto.

CARS (transfer)
Sheldons Limited, Galt, Ont.

CARVING MACHINES
Canada Machinery Corporation, Ltd., Galt, Ont.
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Hespeler Machinery Co., Ltd., Hespeler, Ont.
Valley City Machine Works, Grand Rapids, Mich.

CHISELS
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

CIRCULAR SAW MILLS
Canada Machinery Agency, Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
H. W. Petrie, Limited, Toronto

CHAINS (Silent)
Jones & Glassco, Montreal

CLAMPS (Chain, Carpenter, Cabinet, Pattern Makers, Bench, Mitre, Piling, Mounted and Rotary Wheel)
Black Bros. Machinery Co., Mindota, Ill.
J. A. Fay & Egan Co., Cincinnati, Ont.

CLAMPS (Saw)
Shurly Dietrich Co., Ltd., Galt, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

CLUTCHES
J. A. Fay & Egan Co., Cincinnati, Ohio.

COLUMN CLAMPS
Black Bros. Machinery Co., Mendota, Ill.

COLUMN MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.

CORE BOX MACHINES
J. A. Fay & Egan Co., Cincinnati, Ohio.
Chicago Machinery Exchange, Chicago, Ill.
E. & B. Holmes Machinery Co., Buffalo, N.Y.

CUT-OFF SAWS
Canada Machinery Corporation Ltd., Galt, Ont.
Shurly Dietrich Co., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Berlin Machine Works, Ltd., Hamilton, Ont.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

CUTTER HEADS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Samuel J. Shimer & Sons, Milton, Pa.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

DADO HEADS
C. Mattison Machine Works, Beloit, Wis.
W. A. Elliott, Bathurst and College Sts., Toronto.

DIEMAKERS & MACHINISTS
W. H. Dunne, 1492 Queen St. West, Toronto.

DISK GRINDERS
J. A. Fay & Egan Co., Cincinnati, Ohio.

DOGS (Saw Mill)
J. A. Fay & Egan Co., Cincinnati, Ohio.

DOVETAILING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canadian Linderman Machine Co., Ltd., Woodstock, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

DOWEL MACHINES
Thos. White & Sons, Paisley, Scotland.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J .A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Valley City Machine Works, Grand Rapids, Mich.

DRYING MACHINERY
Sheldons Limited, Galt, Ont.
Morton Dry Kiln Co., Chicago, Ill.

DRY KILNS
Sheldons Limited, Galt, Ont.
Morton Dry Kiln Company, Chicago, Ill.

DUST COLLECTORS
Sheldons Limited, Galt, Ont.

DUST SEPARATORS
Sheldons, Limited, Galt, Ont.

EDGERS (Gang)
Berlin Machinery Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

EDGERS (Single Saw)
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Agency, Montreal.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

END MATCHING MACHINE
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

ENGINES (Steam)
H. W. Petrie, Limited, Toronto.

EXHAUST FANS
Sheldons, Limited, Galt, Ont.

FLOORING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corporation, Ltd., Galt, Ont.
Baxter D. Whitney & Son, Winchendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

FLINT
Wausau Quartz Co., Wausau.

FLUTING HEADS
J. A. Fay & Egan Co., Cincinnati, Ohio.

GAINING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Canada Machinery Corporation, Ltd., Galt, Ont.
H. W. Petrie, Limited, Toronto.

GAS ENGINES
H. W. Petrie, Limited, Toronto.

GAUGES (Saw)
Shurly Dietrich Co., Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

GLUE CLAMPS
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.

GLUE HEATERS
J. A. Fay & Egan Co., Cincinnati, Ohio.

GLUE JOINTERS
Canada Machinery Corporation, Ltd., Galt, Ont.
Canadian Linderman Company, Limited, Woodstock, Ont.
Chicago Machinery Exchange, Chicago, Ill.

GLUE SPREADERS
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

GRINDERS (Cutter)
J. A. Fay & Egan Co., Cincinnati, Ohio.

GRINDERS (Knife, etc.)
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

GRINDERS (Tool)
J. A. Fay & Egan Co., Cincinnati, Ohio.
Valley City Machine Works, Grand Rapids, Mich.

GROOVING HEADS
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Samuel J. Shimer & Sons, Milton, Pa.
Canada Machinery Corporation, Ltd., Galt, Ont.

HAND PROTECTORS
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Jones Safety Device Co., Hamilton, Ont.

HAND SCREWS
Black Bros. Machinery Co., Mendota, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

HEATING APPARATUS
Sheldons, Limited, Galt, Ont.

HANDLE AND SPOKE MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
J. M. Nash, Milwaukee, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.

HUB MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

HYDRAULIC VENEER PRESSES
Wm. R. Perrin & Co., Ltd., Toronto.

INJECTORS
H. W. Petrie, Limited, Toronto.

JOINTERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canadian Linderman Co., Ltd., Woodstock, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Plessisville Foundry, Plessisville, Que.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

KNIVES (Planers and Others)
Shurly Dietrich Co., Ltd., Galt, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Samuel J. Shimer & Sons, Milton, Pa.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
H. W. Petrie, Limited, Toronto.

LACE LEATHER
Sadler & Haworth, Montreal.

LATHES (Pattern Makers')
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Valley City Machine Works, Grand Rapids, Mich.
H. W. Petrie, Limited, Toronto.
Thos. White & Sons, Paisley, Scotland.

LATHES (Turning)
Berlin Machine Works, Lid., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Valley City Machine Works, Grand Rapids, Mich.
Baxter D. Whitney & Son, Winchendon, Mass.
H. W. Petrie, Limited, Toronto.

LOOSE PULLEYS
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corporation, Ltd., Galt, Ont.

LUBRICANTS AND GREASES
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.

LUMBER
Elgie & Jarvis, Toronto.

MITRE MACHINES
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N. Y.
H. W. Petrie, Limited, Toronto.

MITRE SAWS
Shurly Dietrich Co., Ltd., Galt, Ont.
E. C. Atkins & Co., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corporation, Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

MITRE CLAMPS
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.

MORTISING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Jones & Glassco, Montreal.
Valley City Machine Works, Grand Rapids, Mich.
H. W. Petrie, Limited, Toronto.

MOTORS
J. A. Fay & Egan Co., Cincinnati, Ohio.

MULTIPLE BOXING MACHINES
J. A. Fay & Egan Co., Cincinnati, Ohio.
J. M. Nash, Milwaukee, Wis.

PATTERN SHOP MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

PICTURE FRAME MACHINERY
Black Bros. Machinery Co., Mendota, Il.l
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.

PLANES
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corp., Ltd., Galt, Ont.

PLANERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

PLANING MILL MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Chicago Machinery Exchange, Chicago, Ill.
C. Mattison Machine Works, Beloit, Wis.
Samuel J. Shimer & Sons, Milton, Pa.
Baxter D. Whitney & Son, Winchendon, Mass.
Black Bros. Machinery Co., Mendota, Ill.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie Co., Ltd., Toronto.

PULLEYS
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

RESAWS
Shurly Dietrich Co., Ltd., Galt, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

RESAWS
H. W. Petrie, Limited, Toronto.

RIM AND FELLOE MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corp., Ltd., Galt, Ont.

RIP SAWING MACHINES
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Canada Machinery Corp., Ltd.. Galt, Ont.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

SAFETY GUARDS (For Band Saw Machines, Jointers, Rip Sawing Machines, Shapers, Swing Saws, etc.)
Chicago Machinery Exchange, Chicago, Ill.
Fair Manufacturing Company, Racine, Wis.
Jones Safety Device Co., Hamilton, Ont.

SANDERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
J. M. Nash, Milwaukee, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Fisher Sander Co., Berlin, Ont.
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.
Elliot Woodworker Co., Toronto.

SANDPAPER
Black Bros. Machinery Co., Mendota, Ill.

SANDERS (Moulding, Belt and Panel)
Black Bros. Machinery Co., Mendota, Ill.
Chicago Machinery Exchange, Chicago, Ill.
H. W. Petrie, Ltd., Toronto.

SASH, DOOR INTERIOR TRIM AND COLUMNS
M. Brennan & Sons, Hamilton, Ont.

SASH, DOOR AND BLIND MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Samuel J. Shimer & Sons, Milton, Pa.
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.

SAWS (Hand)
Shurly Dietrich Co., Ltd., Galt, Ont.
E. C. Atkins & Co., Hamilton, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

SAW MILL MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
H. W. Petrie, Limited, Toronto.

SAW SWAGES, AUTOMATIC FILERS
E. C. Atkins & Co., Hamilton, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.

SAW TABLES
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

SCRAPING MACHINES
Baxter D. Whitney & Son, Winchendon, Mass.
Chicago Machinery Exchange, Chicago, Ill.

SCROLL SAWS
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Shurly Dietrich Co., Ltd., Galt, Ont.
E. C. Atkins & Co., Hamilton, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.

SECOND HAND MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
H. W. Petrie, Limited, Toronto.

SHAPERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Samuel J. Shimer & Sons, Milton, Pa.
Baxter D. Whitney & Son, Winchendon, Mass.
H. W. Petrie, Limited, Toronto.

SHAVING COLLECTORS
Sheldons, Limited, Galt, Ont.

SINGLE SPINDLE BOXING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.

STAVE SAWING MACHINE
Baxter D. Whitney & Son, Winchendon, Mass.

STORE FIXTURES, FITTINGS
Reflector & Hardware Specialty Mfg. Co. Chicago, Ill.

SURFACERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.
Chicago Machinery Exchangefi, Chicago, Ill.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

SWING SAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

TABLE LEG LATHES
Berlin Machine Works, Ltd., Hamilton ,Ont.
Chicago Machinery Exchange, Chicago, Ill.
Thos. White & Sons, Paisley, Scotland.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.

TENONING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
H. W. Petrie, Limited, Toronto.

TOOLS (Hand)
J. A. Fay & Egan Co., Cincinnati, Ohio.
Samuel J. Shimer & Sons, Milton, Pa.

TRIMMERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

TRUCKS
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Sheldons, Limited, Galt, Ont.

TURNING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.
H. W. Petrie, Limited, Toronto.

UNDER-CUT SELF-FEEDING FACE PLANER
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.

GUMMERS, ETC.
E. C. Atkins & Co., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

UNIVERSAL WOODWORKER PLANER
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
W. A. Elliot, Bathurst St., Toronto, Ont.
H. W. Petrie, Limited, Toronto.

VENTILATING APPARATUS
Sheldons, Limited, Galt, Ont.

VENEER DIERS
Sheldons, Limited, Galt, Ont.

VENEER PRESSES (Hand and Power)
Hydraulic Press Mfg. Co., Mount Gilead, Ohio.
Black Bros. Machinery Co., Mendota, Ill.
William R. Perrin & Company, Toronto, Ont.

VISES (Band Saws)
Shurly Dietrich Co., Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
H. W. Petrie, Limited, Toronto.

VISES (Pattern Makers')
J. A. Fay & Egan Co., Cincinnati, Ohio.

VISES (Circular Saws)
E. C. Atkins Co., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
H. W. Petrie, Limited, Toronto.

WAGON AND CARRIAGE MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.

WINDOW FRAME MACHINERY
Smith & Phillips Mfg. Co., Chicago, Ill.

WOOD PULLEYS
Canada Machinery Agency, Montreal.

WORK BENCHES
Canada Machinery Agency, Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio

Volume Thirteen TORONTO, MARCH, 1913 Number Three

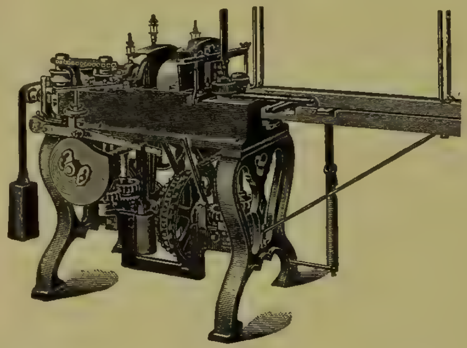
Canadian Woodworker

There is MONEY in the HANDLE BUSINESS

Write for Catalogue of

OBER LATHES

For Turning HANDLES, SPOKES VARIETY WORK



Sanders
Shapers
Rip Saws
Chucking Machines
etc.

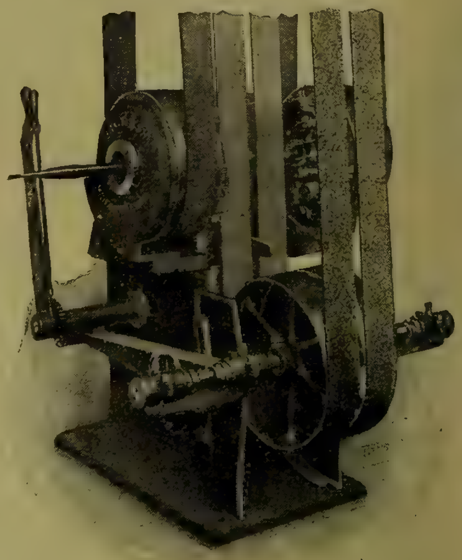
The Ober Mfg. Co.

3100 Bell St., CHAGRIN FALLS, Ohio, U. S. A.

Ask Me for Samples of Work Sanded on the

NASH SANDERS

If you make Broom, Fork, Rake or Shovel Handles, Chair Stock, Whip Stocks, Shade Rollers, Curtain Poles, Dowel Rods, Flag Sticks, or any similar plain or swelled round work **I can show you some results that will interest you.**



J. M. NASH

MILWAUKEE - - WIS.

The Morehead Back to Boiler SYSTEM

will return that water in your Steam Lines to your Boiler.

IF the amount of your steam line condensation is of any volume at all don't waste it. Send for a "Trial Trap" and see how quickly the Morehead System will show savings in your coal bills, repair expenses, etc., not to mention the great improvement in your heating system.

From 20 to 40 per cent. of the heat units in the water of condensation is lost by cooling the condensation down to accommodate a steam pump.

Morehead Traps return the condensation with its full heat content direct to your boiler with practically no drop in temperature.

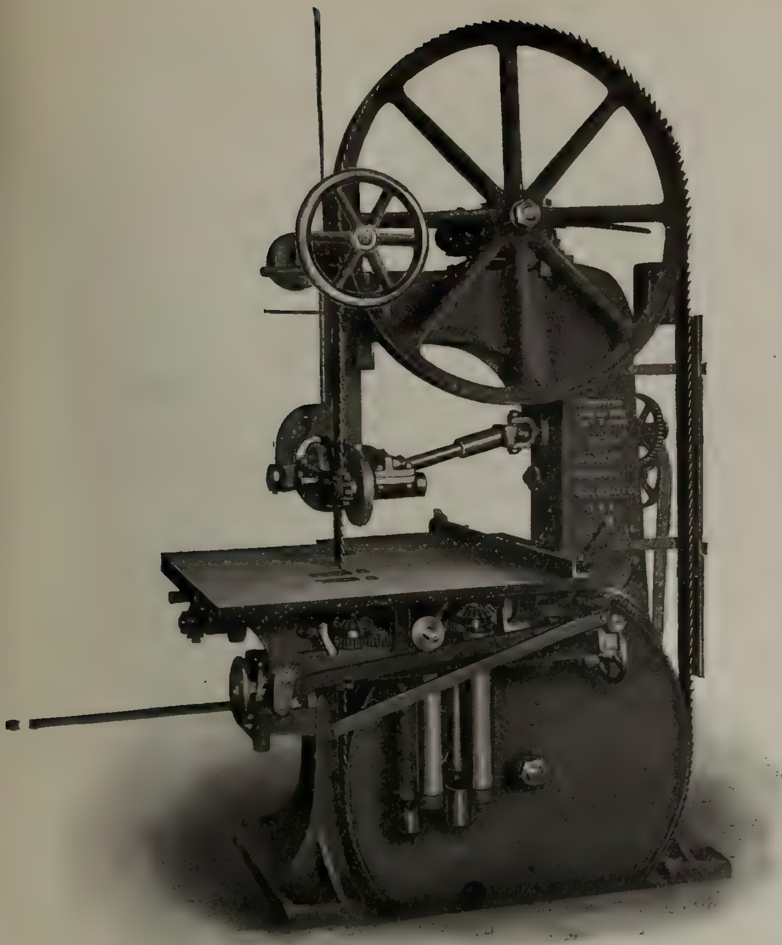
MOREHEADS TRAPS are being used everywhere on Heating, Drying and Cooking propositions of every kind, from straight pipe work to fan stacks and under vacuum conditions without regard to the difference in pressures between the apparatus drained and that carried on the boiler and without regard to the location of the apparatus drained, whether above or below the water line in the boiler.

There is a Morehead Trap for any kind of service. Just state your conditions and we will send you a Trap for free trial.

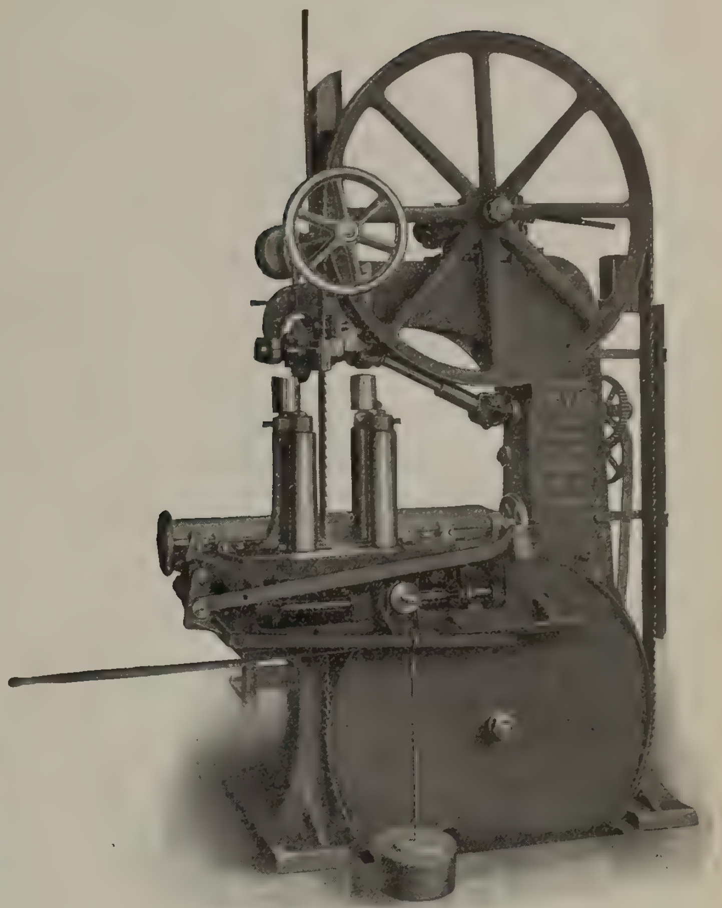
DEALERS AND AGENTS: The Morehead System appeals instantly to users of steam. If you are in territory not already covered the opportunity to secure this valuable agency should not be overlooked. Application of responsible dealers in unoccupied territory will be given immediate attention.

CANADIAN MOREHEAD MANUFACTURING CO. Ltd., Woodstock, Ont.

Canadian Representatives: George W. Cole, Woodstock, Ont.; Robert S. Bickle, Winnipeg, Man.; H. E. Kirkham, Montreal, Que. Robert Hamilton, Vancouver, B. C.



As Rip Saw



As Re-Saw

FAY-EGAN "LIGHTNING" No. 146 Band Rip and Resaw

An economical, double purpose, self-contained tool for factories where there is not sufficient work for two separate machines.

Built on the most modern lines with our proven perfect solid lower and spoke upper wheel arrangement, preventing over-running and choking in heavy cuts. Also equipped with our patented knife-edge straining device which makes the breaking of blades practically impossible even though the speed be twice that of the ordinary Band Saw. The high velocity of the blade permits a higher rate of feed, which means greater output.

Will rip material up to 24″ wide, and resaw to the center of 8″, and takes 18″ under guide.

Write For Circular To-day

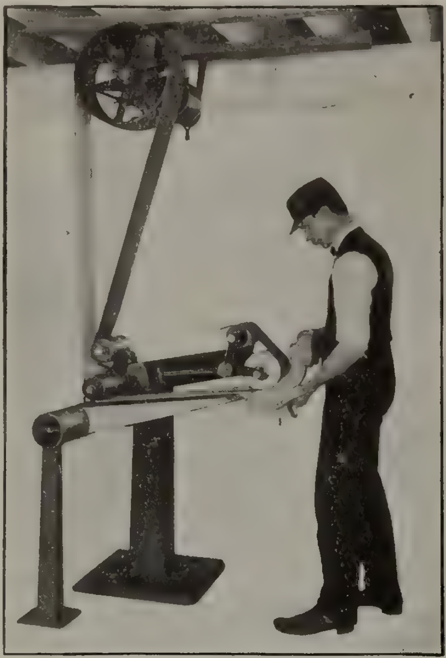
J. A. Fay & Egan Co.

153-173 W. Front St. - - Cincinnati, O.

The "ROCKFORD" Belt Sander

Good on Irregular Work

This machine will sand all kinds of irregular work, cross veneer, O. G. G. moulding, claw legs and spiral veneered posts, also serpentine drawer fronts. The rollers range from 1½ to 8 inches in diameter and can be quickly placed.



The machine is easily changed from one position to another making good and rapid work possible whether crooked or straight stock.

Dust collectors are also supplied with each machine.

The "ROCKFORD" Belt Sander is the best belt sander made for use in furniture picture frame and casket factories.

ROCKFORD TOOL CO.

Harrison and Eleventh Sts. ROCKFORD, ILL.

For Sale by A. R. Williams Machinery Co., Toronto

The M. Brennen & Sons Mfg. Co., Limited

LUMBER DEALERS PLANING MILL

Manufacturers of Doors, Frames, Sash, etc.
Trim and all kinds of Mouldings

Detail Work a Specialty

Rough and Dressed Lumber, Lath and Shingles

We are always glad to Furnish Estimates.
Prompt delivery our Specialty. Write for Price Lists.

Box 107 HAMILTON, ONT.

Profit in Window Frames

Machine does everything shown above.

May be secured in any planing mill by installing a

Perfect Window Frame Machine

The old method of making window frames by hand is comparatively expensive.

Our new machine so reduces the cost of making that a mill equipped with one can easily underbid any "hand-made" competitor and still made a handsome profit.

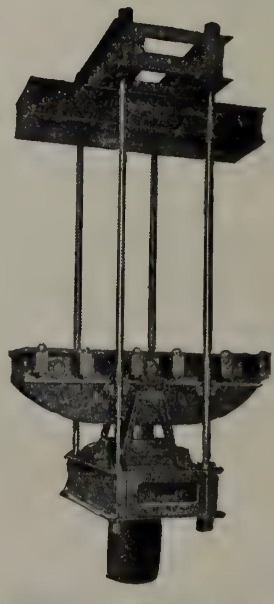
Send for our catalog

Smith & Phillips Mfg. Co.

412-422 N. Sangamon St., Chicago, Ills.

Better ask for particulars of our Stair Router, Edge Jointer, Sash Groover and Light Shaper, an ingenious and effective tool.

Hydraulic Veneer Press



We build these presses in all sizes and styles for all kinds of Veneer work

Write us for Price

William R. Perrin & Company

Limited

TORONTO

Canadian Woodworker

Canada's Only Woodworking Paper

Published in the interests of Planing Mills, Saw Mills, Furniture and Piano Factories, Implement and Carriage Works, Boxmakers and Coopers, Carpenters and Builders.

The Circulation extends from the Atlantic to the Pacific and covers thoroughly all classes of Woodworkers in this immense territory.

Wooodworker Publishing Co., Limited

Nicholls Building Toronto, Canada

United States: E. J. MACINTYRE, 4057 Perry St., Chicago.

SUBSCRIPTION RATE.

Canada, United States, $1.00; Great Britain, Australia 4s 6d.; other countries $1.50 per year. Advertising rates on request.

Vol. 14 March, 1913 No. 3

Inadequate Facilities for the Technical Education of the Woodworker

ONE cannot but come to the conclusion, after considering the facilities offered woodworkers in our technical schools, that totally inadequate attention is paid to this field. In this respect the technical school at Shawinigan Falls, the woodworking department of which was the subject of an article in our February issue, is one of our few creditable institutions, and here practically the whole of the equipment was supplied by a private firm. It would seem about time to interest the proper authorities in the behalf of the woodworking industry, whose ramifications during recent years have been so remarkable. Technical education should not be left to individual enterprise. Its responsibility should be placed upon the state. Canada is not sufficiently alive to the paramount importance of industrial education, although doubtless this cause will receive an impetus after the report of the Royal Commission has been received.

Men who earn the money in the big establishments identified with our trade are men of trained intelligence, men possessing an intimate knowledge of manufacturing processes from the raw material to the finished product, men that can not only set machinery in motion but explain the principles upon which it is constructed.

The secret of Germany's success to-day is that she recognised long since that efficiency without training was impossible. And not only in Germany but everywhere in Europe is technical education regarded as an essential factor in industrial efficiency. The contrast between European methods is shown in the fact that when an industry languishes they establish new schools and offer greater inducements in the way of technical education; we raise the tariff. Can Canada lay claim to supremacy or to a promise of supremacy in any one field? The Swiss, for instance, make the most perfect watches—the watch-making school at Geneva is said to be the oldest trade school in the world; Germany is supreme in the chemical industries. Will Canada ever get into the running?

It is encouraging to note that there is a general disposition to recognize that the basis of industrial training must be laid in our common schools, for in many of our cities a large percentage of boys do not complete their elementary school course. It is in the school that boys showing a bent towards woodworking should receive their first encouragement. We do not mean that an effort should be made to teach them a trade: the aim should be to provide a basis for specialized training later on, whether in the school or the workshop—or better still, in a combination of both. We shall accomplish much for the industry if we can give our boys a bias towards the trade so that on leaving school they will have a well-defined ambition to qualify among the best. The trouble with our educational system at present is that it is not sufficiently specialized for the trade worker.

Technical education is a many-sided problem which will take years to solve. There is much experimental work to be done, and several kinds of schools will probably be evolved before a satisfactory system is attained. The woodworking industry should recognize its responsibility as other trades are doing. In this field as in others, great things have been done by private individuals and by the larger firms generally, but it would seem that much more might be influenced by a strong association of employers.

The responsibility of allowing a generation of men to grow up in the trade without learning it cannot be shelved.

The Public Library and the Workman

THE public library can be made a valuable auxiliary in the shop training of boys, as in the cities and many of the towns the more important technical papers are to be had at the reading rooms. Not only is he assisted in his education in matters pertaining directly to his work and the tools and machines he operates, but he is taken into the atmosphere of the best organized shops and is given an intelligent idea of management and system. He is removed from the danger of acquiring the narrow viewpoint characteristic of a great many of his associates, especially the older men, from whom he is likely to absorb a prejudice which may be hard to overcome later. One of the great barriers between the employer and his workmen is that of employees' ignorance of many things of which they often assume to know. Take, for example, the matter of costs. The average workman figures an extraordinary profit on work which he is assisting to produce. He adds together the cost of material and that of labor, concerning which he has some knowledge, and forgets entirely the fact of overhead cost, of which he has scant realization. The strong prejudice which exists in some places against the bonus or premium system is based entirely on a lack of comprehension on the part of the men. Such matters are given much careful attention by the technical journals for the benefit of both the owner and the men in his shop. In some establishments the papers are regularly on file and are available for the use of employees in all departments. Where this is not done it is an easy matter to suggest to the apprentice and other beginners—in fact, to everyone in the shop—that they would find it worth while to drop in at the library and look over the current literature which has to do with their employment. That many men avail themselves of this opportunity

is apparent to all who have occasion to visit the reading rooms of the libraries, for certain journals are in almost continuous use.

The Outstanding Value of Time

By N. E. Duffy

IT is an old saying that time is money. Yet we see day after day, year after year, men who are losing at the spigot what they are trying to save at the bunghole. My attention was called very forcibly on one occasion, while soliciting subscriptions. On inquiring for the man in charge of the job, I was directed to the employer who happened to arrive just at that time. I informed him what I was representing, and went on to explain the nature of the work, and what it contained, when he said: "My dear boy, show it to those four men who are working on the verandah; I am a subscriber but they should have it." When I had shown it to them he told me to go over on another job of his where there was eighteen men at work, tell the foreman who sent me over, and he wanted every man on the job to see it and if possible to get their subscriptions. I said that it would take some time to show it to the eighteen men. His answer was, "All the time it will take I will gladly give you. Every minute you will take and every subscriber you will get, will save me hours during the coming year. My dear sir, I know the value of the paper. I am in the business to save time, make money, and to give you an idea how I figure on time is like this: I have forty men working for me. We will take one man who loses five minutes on some part of his work in hunting up the man in charge to get information that he should know himself, and if not hunting him up, kill time until he comes around. Five minutes is a low estimate for one man each day. Forty men would mean forty times five minutes or two hundred minutes"; and taking out his pencil he began to figure two hundred minutes for forty men in one day, six days, twelve hundred minutes or twenty hours in one week, and as these men work about, we will say forty weeks during the year, see how much time is gone and money lost. Who loses it? Do I make it plain? Go ahead, make it strong; impress on their minds as forcibly as you have explained it to me and show them that the more information they have on these lines will be to their advantage, making the work of their hands easier by having more knowledge in their heads.

The Man Who Wins

The man who wins is an average man:
Not built on any peculiar plan,
Not blessed with any peculiar luck;
Just steady and earnest and full of pluck.

When asked a question he does not "guess"—
He knows, and answers "No" or "Yes;"
When set a task that the rest can't do,
He buckels down till he's put it through.

Three things he learned; that the man who tries
Finds favor in his employer's eyes;
That it pays to know more than one thing well,
That it doesn't pay all he knows to tell.

So he works and waits; till one fine day
There's a better job with bigger pay,
And the men who shirked whenever they could
Are bossed by the man whose work made good.

For the man who wins is the man who works,
Who neither labor nor trouble shirks,
Who uses his hands, his head, his eyes:
The man who wins is the man who tries.

Specialized Lines in Woodworking

By G. K. T.

MORE and more will the woodworking plants of the future become special plants for the manufacture of some special kind of work, and the more the plants specialize the better the work will become. For instance, to-day the small planing mill that makes a practice of getting out all the material which it uses in its business, will not be able to cope with the mill man who realizes that it is better to purchase his stock of veneered doors from a factory, than to try to make them with his crude equipment.

The same applies to other lines of goods, such as interior trim and hardwood flooring. Take the method of manufacturing flooring in the planing mill; they usually have a soft wood matcher, on which they make all their matched stock, whereas the flooring plants are fully equipped with their heavy hardwood matchers and thin steel knives, which are jointed to a fine edge, insuring every knife a cutting edge. Then these plants have costly machines in the way of end matchers and polishers, and last of all, but not least, by any means, the flooring is passed to the graders, who being experienced men in the manufacture of flooring, are capable of putting it in the several grades which are made in each flooring plant.

Apart from all this, there are the inspectors who keep continually testing for any fault that might show up during the process of manufacture, and the superintendent is walking around all day spying out any imperfections.

By this means, a plant put up to manufacture flooring is able to turn out a much better grade of goods than if it is making a hundred and one different articles. The same applies to doors and all other kinds of manufactured articles along the woodworking line. The manufacturers of woodworking machinery realize this, and they have specialized in the building of fast-feed hardwood matchers. The speed at which these machines turn out work was not dreamed of a few years ago.

The writer had the privilege of visiting a number of flooring plants both here and in the Southern States, and in one plant saw a matcher, of the extra heavy type, that was feeding red and white oak at one hundred and fifty-six feet a minute. The writer asked permission to feed the machine and try if it were possible for a man to keep the machine full at that speed.

After trying it for the space of one hour he found, to his satisfaction, that it was quite possible, providing the stock were good.

The writer could not see much difference between a one hundred feet feed and a one hundred and fifty-six feet feed in the quality of work which was turned out, and that was of a very high order.

The writer brought back some samples which he would be pleased to show the Scribe of the Woodworker, should he, at any time, be in the neighborhood of the writer's office.

Taking Measurements Quickly and Accurately

EVERY carpenter should learn to take measurements quickly and accurately. Many carpenters squander lots of time in taking measurements. Carpenters who have much laying out to do should carry both a two foot rule and a five foot rule. These two rules can both be carried in the apron pocket. Suppose it is necessary to measure off ten feet, with the two foot rule you have to measure five lengths of the rule to get it, with the five foot rule you have a mesure only two lengths. The five foot rule is a handy rule to have in your pocket and there is frequent use for it. Use it for taking long measurements. You will find it much the handiest rule for laying out door and window openings, partitions, etc. Of course, it takes more time to open up a five foot rule rule than it does a two foot rule. If you are laying out work and have frequent use for the rule do not close it up or just close it once making it two and one-half feet, then it is as handy to carry in your hand as a square or you can set it down near by, same as you frequently do when you are using the square. But always keep it within easy reach. If you are taking short measurements, say two to four feet, then it is the handiest to use the two foot rule. I advise the carrying of both rules, using each where it will best serve.

Some will say, "what's the use of all this? I won't get any more pay for doing it this way than if I don't." This may be practically true; but here is something to think of. Your employer will never advance your wages before you can prove to him that you are worth it. You have always got to earn more money than you are getting, before you can get it. If you were hiring men yourself you would not raise the wages of a man who to all appearances you were paying all the man was worth. It is the same with others the world over and if you want the best jobs and the best pay you must always be on the lookout to increase your efficiency and means of producing results. It is in this way that you stand in line for promotion and a raise in wages. If your present employer does not recognize your worth in time, someone else will, and sooner or later someone will offer you a better job and at better pay. But this is not likely to happen to the man who drags along in the same old way and in the same old class. The demand for the men who can produce the best results is always good and this class never goes begging for a job so it stands everybody in hand to increase their efficiency in every possible way.

Perhaps the worst abused, and most neglected tool— if it can be called a tool—is the carpenter's oilstone. It is rarely or never cleaned, and the oil is left on it after using. It is seldom protected by a cover, and the particles of metal worn off the tool sharpened and the shop dust, are left to be soaked in along with the oil until the face of the stone assumes a metallic surface, and the stone itself ceases to be an abrading instrument, and gets cursed by the careless workman who has, through sheer idleness, or ignorance, allowed his faithful friend and assistant to drift into comparative uselessness. Clean, protect from dust, and keep a flat and even surface on your oilstone, and you will be happier and will swear less.

Responsibility

Accept the task
  And make that task your own;
By and through it,
  Your talents shall be shown.

Power grows on power,
  So step by step improve;
Avoid the easy way—
  The common groove.

On trained discernment,
  Fix your firmest thoughts;
Thus duty comes as pleasure
  And not with trouble fraught.

Keeping Tools in Order

When you get some new tools that are bright and shiny you generally take a little more pains with them than you do of the older ones, for awhile until the new wears off. That's not long, though, for the particular polish the manufacturer puts on them just won't stay with them somehow, and for awhile when it begins to go, the newer tools look worse than the old ones that have taken on a sort of dull wearing polish of their own.

The new tools will get the same dull polish on them in time if you keep using them and take proper care of them. And right here it is in order to say that the best way to keep tools in good shape is to keep them in use. For when you lay them away, unless you take unusual pains about it, they are soon damaged by rust.

The simplest way to keep tools from rusting is to have some oily waste, not only at the shop, but along in the tool box, and rub each tool off with this when you go to put it away after using. If it has been raining or the tools are moist from perspiration from the hands, they should be carefully dried off at night before using the oily waste for rubbing, because the oil and moisture will not mix, and the moisture will stay underneath the oil. Chalk is an excellent thing to dry off with, and this is cheap and generally handy. If it is not, anything in the way of a dry absorbent powder will do.

This is the main thing, clean the moisture off regularly to prevent rusting, and use the oily waste to rub with, and in the course of time there will develop a sort of polish that will stay and hold its own better than the high shine that is put on by the tool maker. Tools properly looked after this way do not get rusty or old looking, and it all comes easy and natural when you once get the habit.

The Manufacture of Commercial Furniture at the Plant of Messrs. Jones Bros. & Company, Limited, Toronto

THE largest woodworking plant in Canada devoted entirely to the manufacture of what is known as Commercial Furniture is that of Messrs. Jones Bros. & Co., Limited, of Toronto. A description of their main factory and some of their methods should be of interest to the woodworking industry. This company manufacture only commercial furniture, that is, show cases and store fixtures for all kinds of retail and department stores, paying special attention to the requirements of druggists, jewelers, gent's furnishers, tobacconists and dry goods firms. They are generally recognized as the leaders in these lines.

The head office is in Toronto, where they have a branch factory. They also have branches in Montreal, Ottawa, Winnipeg, Saskatoon, Regina, Calgary and Edmonton, carrying stocks of cases for immediate delivery. In connection with their Montreal branch they also have a factory for making special work and for assembling the larger contracts for that city which are built in the main factory at Dundas, Ont.

The business was established in 1887 by Mr. Sidney Jones and later was formed into a joint stock company with a capital of $200,000, Mr. Jones becoming President, which position he occupies at the present time. Mr. Jones is also a director of The Sterling Bank of Canada, The Continental Life Insurance Company, and The British American Security Company. The Vice-President of the company is Mr. G. B. Woods, who is also President of The Continental Life Insurance Company. The general manager of the company is Mr. R. J. W. Barker, and the secretary-treasurer, Mr. H. S. Garlick.

The company has about two hundred employees, 130 of whom work in the main plant at Dundas, Ont., under the superintendence of Mr. George Halberstadt, who is one of the best men in this class of work in Canada.

The work in the main factory is divided into departments, each under the direct control of a foreman or sub-foreman. Each department reports daily to the superintendent and the factory office, which in turn reports to the head office in Toronto in which is kept, by means of an ingenious system of card indexes, an exact record of every job, or part of a job, in the factory, showing the department that it is in and how nearly completed, thus keeping every stage of the work in front of the management without need of further enquiry.


Portion of lumber yards on the left, and on the right, the machine room, at the Dundas factory of Messrs. Jones Bros. & Company, Limited

The routine of an order is as follows: the order is sent out in the shape of a docket from the head office in Toronto to the factory office in Dundas, where it is registered and entered on the factory records. It then goes to the superintendent and from him to the drafting department, where it is designed (if special work) detailed and billed. The lumber bill goes to the foreman of the stock department who lays out the lumber and delivers it to the saw room where it is sawn to dimensions, resawn and made into mouldings if required. The machine foreman then takes the work and prepares it for the cabinet room, turning whatever part is necessary over to the veneer foreman, for veneering or glueing. In the cabinet room are three separate departments, the show case room, stock fixture room and special fixture department, to one or more of which the order is handed under the general control of the cabinet foreman. From the cabinet room the work goes through the finishing, trimming and shipping departments, each under a sub-foreman,

Plant of Messrs. Jones Bros. & Co., Ltd.

The upper illustration is reproduced from a photograph of the Main Factory Building at Dundas, Ont., where some 130 workmen are employed under Superintendent Halberstadt. The lower view shows the Finishing Building.

Main cabinet room

with a general foreman over the three. When shipped the order is returned to the factory office, where in the meantime the cost has been recorded from day to day, and with the completed cost it is returned to the head office at Toronto.

The general plan of the factory is laid out to correspond with the above routine of the order—that is, to have a continuous movement of work without any lost motion or retracing of steps.

The lumber used, which is of course the principal raw material, consists of mahogany, Circassian walnut and quartered oak for exposed work, with basswood, poplar and chestnut for inside work. This is kept in the yard and in large dry sheds that are completely covered and heated. The stock on hand at any time in the yards and sheds is never less than 500,000 feet. Of this at least 100,000 feet is always kept kiln-dried, besides that in the kilns, which have a capacity of about 75,000 feet.

The kilns and dry sheds are directly connected with the factory. By a system of transfer tracks a whole car of lumber can be taken from either the kilns or sheds and raised up to the sawing department by one of the largest elevators in Canada, or can be run into the resawing and moulding room in the basement to be made into mouldings or strips. The latter room is equipped with a McGregor & Gourlay 48 in. band re-saw, a lightning cut off saw, a self-feeding rip

Corner of the finishing room

saw, a Berlin 4-sided moulder and an Austin & Eddy moulding sander.

When taken up to the machine room the work is routed, according to what is to be done on it, through 33 different machines from the cut-off saws to the sanding department. Nearly all of these are of the latest type and all of them are guarded for safety as much as possible, even the surface planers being the Falls Machine pattern with chain roll feed.

In this connection it might be remarked, as will be seen from the illustration of the machine room, that there are no overhead or exposed belts, the shafting being carried on cement piers in the basement, the transmission belts coming through the floor in boxes.

The veneering and glueing department is in a separate building connecting with the machine room and is equipped with a Jackson Cochrane continuous feed jointer, power and hand veneer presses and complete equipment of aluminum cauls and boards. The stock of veneer, which is very heavy, is kept in a specially equipped room in the basement of the veneer room.

The sanding department, considered one of the most important branches of the factory, is equipped with a Jackson Cochrane 48 in. 3-drum sander, a Fisher belt sander, a Fisher triangular belt sander, and adjustable belt sander, a brush moulding sander and a disc and drum sander. The cabinet or bench rooms are also furnished with sanders, variety saws and small machines for rapid work.

The main cabinent room is 50 x 150 ft. Connecting with it are the show case room, 50 x 60, and the stock fixture room, 50 x 60. These are all lighted from all sides and from the roof. Each is well ventilated and heated and is equipped with the latest appliances in the way of the newest types of benches, glue heaters, heating coils, etc.

The work reaches the cabinet room on trucks by a second elevator at the extreme end of the machine room, from where the lumber is brought into the building. When the work is put together it is taken by an overhead bridge into a separate building for finishing.

The finishing department is sub-divided into three branches, each in a separate room, called the filling, varnishing and rubbing rooms. In the first, the wood is filled, stained and shellaced, when it goes to the varnish room where it receives two to five coats of varnish and is dried under artificial heat, reducing the usual time of hardening by about 50 per cent. After it is completely dried, it is rubbed and polished in the rubbing room and if for stock is taken over another overhead bridge into the storage building or lowered by a third elevator into the trimming department.

In the trimming room, every case or fixture is set up exactly as it will be when finally erected in the position it is to occupy. All glass is put in frames, all hardware is put on and after inspection the finished work is taken to the shipping room into a separate building and is packed and shipped to its destination.

In connection with the trimming room there is a large storage room for glass and a small but complete glass plant for grinding, bevelling and polishing plate glass. The shipping room is equipped with cut-off and rip saws for cutting packing material.

Besides the buildings already described there are several others, such as stables, oil and varnish house, and fire hose house, that possess no special interest.

The power used is supplied by a 250 h.p. engine

Portion of trimming room

and boilers, with auxiliary engines for pumps and blower system. The lighting is by electricity from the company's own plant.

One of the noticeable things about this plant is the interest taken by the company in their employees' welfare. Light, ventilation, and warmth in winter are the three features of the layout of the buildings. Safety appliances are used on all machines and elevators. Five different sets of lavatories are installed in the various buildings. Stand pipes, fire extinguishers and fire buckets are provided in every flat and a fire brigade with hose and reel is maintained by the company.

The plant is situated at the extreme west end of the town of Dundas and covers about three acres of ground directly below the Grand Trunk station on the side of the mountain. A switch from the T. H. & B. railroad runs directly to the factory. The Hamilton and Dundas Electric Road also has its terminal 100 yards from the factory door and a special service leaves the terminal at closing hours to convey the workmen to their homes, who live at a distance from the plant.

The situation is ideal. Behind the factory, to the north, towers the Dundas mountain, nearly 1,000 feet high; in front, the beautiful Dundas Valley stretches towards Hamilton; to the east again the mountain curves and almost at the door a turbulent waterfall

Shipping room

forms a small river flowing to Lake Ontario three miles away.

Dundas is a beautiful town of historic interest and offers advantages to the mechanic not possessed by many towns of its size. Rents are low, land is cheap and the cost of living is small compared with city life. Added to this is the advantage of its proximity to Hamilton from which it is fifteen minutes' ride by train or half an hour by trolley.

The wages paid in Dundas are practically the same as in the large cities and are higher than in the smaller woodworking centres. Jones Bros. & Co., Limited, supplement these by bonuses and premiums for good work, their aif being to turn out only the highest grade of work and to have in their employ the highest grade of workmen, believing that "as the man is, so is the work."

The success of their methods is indicated by the fact that since the establishment of their business they have never had to lay off a man for lack of work; they have never closed down a day except for urgent repairs; they have had to run double time with a full staff for the greater part of the past five years, and they were not able to accept any orders in 1912 for delivery under six months. During 1912 they installed the largest jobs in store fittings ever turned out in Canada. These included outfits for the Jas. A. Ogilvy store in Montreal, The Hudson Bay Company, Winnipeg, the McKinnon Company, Weyburn, Sask., Bergyl & Kusch, Regina, and The J. F. Cairns Company, Saskatoon—all department stores and all in mahogany. At the present time they are making outfits in mahogany for The Hudson Bay Company, Calgary, The McMillan Company, Saskatoon, and The Snell Company, Moose Jaw, three new department stores, besides turning out about fifty other smaller contracts for different retail stores from the Atlantic to the Pacific.

The Glass House

Probably the oldest art is that of house building; yet after generations of experience, and myriads of experiments we have made but little progress.

The city flat ought to be the ideal residence for human beings. By every law of evolution, and the growth of efficiency it should be the best possible arrangement for comfort. And, on the contrary it is appalling in its slavery to old ideas.

For the city is merely the old baronial castle, or English country house, contracted. We also must have our reception room, parlor, sitting room, bed room, and kitchen, even if they be each but six feet square. We live in chambers adapted to what others are supposed to think we need, rather than to what we really want. Convention outweighs convenience and inherited ideas practical efficiency.

In the average dwelling house, the thing that impresses the radical mind is the waste space, the space devoted to the occasional visitor, to "company," and the lack of roominess in the family quarters..

About the most radical modern structure is the office building; there no hereditary idea existed to smother intelligence.

The residence, and the flat building, of the future, when the ghost hands let go of us, will be mostly glass with steel and cement enough to hold it.

The proper housing of a human being is glass, because it is the nearest thing to being out of doors.

The Veneer Industry at Montreal West

A Complete, Illustrated Description of the Factory and Equipment of The Dominion Mahogany & Veneer Company, Limited

AMONG the new industries which have arisen in the district of Montreal is the Dominion Mahogany & Veneer Company, Limited, of Montreal West. There are other concerns making veneer in Canada, but the Dominion Company is the only one manufacturing mahogany veneers in addition to other varieties. The president is Senator N. Curry, the vice-president and managing director Mr. Arthur Rushforth, the assistant general manager Mr. Geo. Kersley, and the superintendent Mr. W. Stadden.

Front view of plant

The company, which employs 70 men, have one of the finest factories, if not the best factory, on the North American continent, both for the manufacture of lumber and for making veneers. It is a concrete building 220x75 with three floors on one side and two on the other. The offices are ample and nicely fitted up. Everything is substantially built, and the equipment is of the best. Shipping facilities are excellent, both the Grand Trunk and C. P. R. serving the factory. The chief trade catered for are the piano and furniture makers, contractors and railway car establishments.

Mahogany, circassian walnut, English brown oak sawed and sliced, rotary cut birch, maple, elm and beech for drawer bottoms, panels and centres for furniture manufacturers, are the chief woods used. Some of the veneers are magnificent in their figuring, and are utilized for the highest class of work.

Although the company have been manufacturing only since the month of November the factory has been running to its capacity and the output is booked up for the next four months. The company's customers extend from the Atlantic to the Pacific. Mahogany is shipped from Liverpool, the centre of the world's trade in this wood, and the company get logs from various parts of the world, including South Africa, South America, Cuba, etc. The company have also timber limits in the province of Quebec for birch and maple, and manufacture these logs into veneers for drawer bottoms; panel stock and centres for the furniture trade; and pin block stock for the piano trade. The logs are cut into thickness of veneer from 1-24 to ¼ of an inch, both sawed and sliced. All mahogany logs are quartered, and all lumber is piled on sticks. The refuse is taken by a blower system to the boilers and burned. As an indication of the solid type of construction it may be mentioned that the foundations for the machinery go down fourteen feet.

The logs, on arrival, are placed in the yard, where they are cut into lengths by a drag-saw lifted by derrick to the mill room, and then moved on a truck, which runs on rails to the saw carriage. This takes the logs to the big band sawmill, where they are cut into whatever thickness of plank is desired. That dust drops down and is carried away by suction. The

A corner of the lumber yard at the Dominion Mahogany & Veneer Company's plant

Dominion Mahogany and Veneer Company's Plant

Band mill showing log ready for cutting

View of the filing room

One end of the stock room

Veneer slicer machine

Veneer saw

Rotary lathe cutting drawer bottom stock

Rear view of plant and log yard

boards are conveyed on rollers and then by means of conveyors to the edgers; they are fed through these after having the edges removed, and go to the trimming saw. Afterwards, still by means of rollers, they are sent to a sorting table in the yard below, where they are sorted. The saws in the edgers are movable and thus adjustable to the sizes required.

The logs which are required for veneers come into the mill by the same means, and are cut by the same process. The flitches are then conveyed to the sawmill, where they are manufactured into the different thicknesses of veneer and are afterwards rack-dried.

On the ground floor logs are brought in the round from the yard and put into a tank, where they are boiled for twenty-four hours. The logs are then placed in a rotary lathe and the veneers made by the rotary process. The veneers are taken to the clipper and cut to size, hence into the automatic dryer and after being crated are ready for shipment.

Mahogany, after being steamed, is taken to a slicer, where it is cut into veneer. The machine is very substantially built, the logs being held by dogs, and the knife automatically brought into contact with the lumber. The veneers then go to the dryer, which conconsists of a series of layers made of chain, and the veneer is fed through this until it comes out at the other end, meanwhile receiving treatment by hot air fanned into the machine. The filing room is on the top floor and very well equipped with the most modern machinery by experts.

There are two sample rooms, where are kept over one million feet of veneer in stock. Each log is carefully tagged and tallied. From every log three samples are furnished to the traveller, each sample being hinged into lengths, and these are so arranged as to fold into trunks.

The company supply a special filtration system for drinking water and also a luncheon room. There is a telephone system right through the building.

The Watrous Engine Works Company, Limited, Brantford, Ont., supplied the sawmill machinery, band saw, edgers, engine of 250 horse-power and boilers of the Dutch oven type; the Capital Machinery Company of Indianapolis, the slicer, rotary, and veneer saws; the Simonds Canada Saw Company, Limited, the other saws; the Canadian Fairbanks-Morse Company, Limited, Montreal, the trucks; and the Philadelphia Textile Company, the dryer.

Building and specifications were designed by E. & W. S. Maxwell, architects, Montreal; while F. J. Jago & Company were the contractors for the reinforced concrete; McGregor, Reed & McGregor, the brick work; Hickey & Aubut, the steam fitting.

One end of band mill, showing edger and live rolls

Common Problems in the Glue Department

Methods that Make for Efficiency

IN the majority of cases the glue room in any woodworking plant will be found to provide more problems to be solved than any of the other departments of the establishment, consequently a few reminders of certain well-proven rules or facts may not be found to be amiss in this matter, writes Richard Neubecker, in The Woodworker.

While nearly every plant may have different ways or forms of doing certain work, so that no specific rules can be ascribed to any particular method of doing a certain job, and while in most cases the men with authority in these departments must use their own judgment in solving different problems that may come up from time to time, by exchanging opinions as to certain tasks, we may learn a little more of how others solve problems that some time in the future we may be called upon to solve.

For the beginning let us take up the subject of cleanliness in the glue room. Many men who have charge of glue rooms do not believe much in keeping things neat and trim; otherwise there would not be found so many glue rooms in which a person may see strewn about the floor all the different varieties of wood that particular plant keeps in stock. These pieces constitute the material that may have developed checks, breaks on ends, or other defects which may have escaped the eyes of the veneer inspector after they came from the drying machine.

Now, isn't it just as easy to place all these "outs" on a separate pile or truck, and at the finish of the day's work take this material back to stock room, where it may be trimmed down to whatever sizes it will make, and placed on proper piles, instead of having it lying on the floor, to be trampled upon by the men, and in the end be consigned to the scrap pile?

While the rear end of the glue-spreader may be a bad place to keep clean, in some instances nevertheless this may be greatly overcome by taking the old sandpaper that has been worn off on sanding machine and been discarded, and placing it, with sandpapered side upward, back of glue-spreader. This will help keep the floor clean and can easily be removed and new paper placed, as a sander will usually furnish enough paper to supply the needs of the glue room.

At least ten minutes should be allowed the men before meals or quitting time each day to remove glue from spreader, cleaning off spreading roll, and for the men to clean up themselves. By doing this everything will always be found neat and clean, and the men will take a greater interest in the performance of their duties than when everything in topsy turvy or out of place.

Laying Veneers

The laying of veneers is a very important part in the manufacture of veneered goods. By placing the face side downward, or next to glue side, the bad or open side of rotary-cut veneer will come on outside and will greatly detract from working out smooth, and consequently lower the grade of the product. A good plan is to face-mark all veneers before beginning to lay them, with white or light-blue chalk commonly used in marking plumb lines, etc. The ordinary lumber crayons are not advisable to use, as on thin face veneer they penetrate too deeply and are difficult to remove without coming too nearly going through the veneer to core body to remove the marks.

While an experienced man may be able to lay oak and birch without being marked, with fairly good results, when it comes to red gum it is a different question; for in this variety of veneer it is hard to distinguish which is the face side and which is not; and, curiously enough, this is the wood that shows up the most if glued wrong side up.

Medium-priced glue for ordinary veneering purposes is advisable, say from 9c to 13c a pound, for in the higher-priced glues there is sometimes a loss in relative spreading values, considering the difference in cost. Experience, however, is the best teacher for the different lines of work. While a 9c or 10c glue may give the best results on some varieties of wood, a higher-priced glue will sometimes be necessary for other varieties. A slow-setting glue is always best to use, as this will insure more positive results against chilling than the quick-setting kind.

A Simple Test

A simple way of testing the absorbing quality of glue is to take, for instance, a sample weighing 1 lb. and soak it in cold water for twenty-four hours. At the expiration of this time the excess water is poured off and the glue jelly is weighed. The weight this shows is deducted fom this amount; the remainder is divided by the weight taken, and you have your result of absorption. The amount of water the sample takes up and the character of jelly found, indicate the source and quality of the glue being tested.

At least one extra boiling kettle should be provided in the glue room equipment, as this will give the crew plenty of chance to keep kettles alternatingly clean and in good shape. Kettles should all have safety valves, or blow-off valves, as they are commonly called; this will prevent an explosion, if, through forgetfulness, the stopcock on outlet is left closed while the feed pipe is open. This will give plenty of warning, when blowing off, of the approaching danger, which can easily be avoided at this stage. The writer well remembers an explosion of this kind, in which he escaped unhurt, although some of the crew were not as lucky as that.

The best cauls I have ever used were made of ⅞ in. maple, glued up three-ply to proper dimensions, and greased with vaseline to prevent glue from sticking to them. And, furthermore, if they should need any smoothing off later on, this can be easily done by taking them to the sander and smoothing off as much as desired.

In veneering door stock it is always best to put only a single form of core in each pressing; otherwise, if a double form is made, there will always be found a slight variation in thickness of rotary-cut veneers, which, in forty to fifty pieces of veneers—which amount sometimes goes in press—figures quite a little in producing uneven pressure on either one side or the other of the double form.

Naturally, everybody strives to produce every piece of veneered material in perfect shape, but, just the same, there will always be found a certain percentage of defects of one kind or another, and which it would

be hard to eliminate entirely. However, a well-known manufacturer recently said that he is always satisfied with the glue room work if he gets 95 per cent. perfect pieces out of each day's run. There may be glue rooms that probably do not come up to this standard, and, to the contrary, there may be some that do better; but, taking it altogether, this seems to be a reasonable standard to go by.

Use of Sawdust for Cleaning Purposes

Absorbing Power Variable According to Direction of Cutting—Grain and Fibre—Qualities of the Several Woods—Preparation of Sawdust — Its Application for Cleaning Purposes

THE absorbing power of wood, even of the finest wood shavings and sawdust, depends to a large extent on the direction of cutting with or against the grain. If the wood is cut with the grain, the absorbing power is very small as the different minute particles of fiber are still surrounded by a sort of protecting envelope. It is only when we cut across the grain, in other words cut at right angles to the direction of the fiber, that the cells of the wood are opened and given that power of absorption necessary for proper use of sawdust for cleaning. The wood fiber has a certain absorbing factor for liquids as can be easily tested, and this power is to be exploited to its fullest extent.

Grain and Fiber of Sawdust

The best sawdust for this purpose is that obtained from pine wood, cut with a heavy saw with large teeth. The wood must not contain too much gum, of course. If the pine is first moistened, and if dull saws are used, a very soft almost woollike material with great absorbing powers is obtained.

Sawdust and shavings of hard woods give a coarser or finer grained dust, which does not have these high absorbing qualities but can be used for other purposes. By cutting the wood across the grain in the proper manner, the fibers are not only torn apart but laid open to absorb any liquid with which they are brought in contact.

We would find an excellent cleaning material in sawdust if the fiber were not so short. For removing oil or fatty deposits from machine parts, we must have some cohesive material, however, like cotton waste.

Sawdust could be used to good advantage, nevertheless, if we could find some powerful absorbent which could be used as a covering or envelope for the shavings. This covering would then suck up the oil, would pass through the same and would then be absorbed by the sawdust beneath.

Sawdust is used at present in many machine shops to clean machine parts or metal articles from oil or fats and afterwards drying them by dipping in clean sawdust. If oily, fatty, or even acidic liquids are spilled on a table, sawdust will be found to be one of the best absorbents to use.

Vessels and bottles filled with oils, fats or acids can be cleaned in the same way by using sawdust. If the necks of these bottles are too narrow, the latter are filled about half way with sawdust, are thoroughly shaken, and then left to stand about 24 to 36 hours. The bottles are then rinsed with water, alcohol and soap water until all the sawdust is removed.

Sawdust has also been used with excellent results to clean machines and vessels used for treatment of fats and oils. The application is somewhat similar, the machine parts being rubbed with sawdust, though, as the same absorbs oxygen during the cleaning process, and this with the oil or fat is able to store up enough heat to lead to spontaneous combustion. The sawdust should be kept in sheet iron receptacles and be burned at very frequent intervals.

Sawdust has also been used for dustless cleaning of floors. This is especially valuable in summer and in factories where much dust is collected and accumulated during working. Instead of merely sprinkling the floor with water, thoroughly moist sawdust is used. Sprinkling of floors with sawdust in the country stores and farm houses is an early application of this principle.

Lately we find that sawdust has been used to manufacture patent cleaning powders for use on carpets and rugs. The sawdust is mixed with some liquid which will keep the former moist for a long time. To impregnate the wood with such a liquid, cheap mineral oils are used, since these oxidize very little. They also use the so-called aqueous oils, i.e., such oils as mix with water; finally hygroscopic, inorganic salts. Great care is used in mixing the sawdust with oil, in order to obtain just the right mixture, for, if too little oil is used, the sawdust will not give the highest absorbing efficiency, and if too much is used, the mixture will leave oil and fat stains on the carpets.

Preparing Sawdust for Rug Cleaning

The sawdust is usually spread on a large plane surface, and is then saturated with a carefully weighed, known quantity of the oil, then both are thoroughly mixed and kneaded until a sample shows that none of the sawdust is dry. When the two are properly mixed, they are heaped up and left over night so that the oil can soak into the fiber, and spread evenly throughout the same. The viscosity of the oil as also the dryness of the sawdust is of prime importance. Mobile oil with slight viscosity is easily absorbed by the fibers, provided they are dry, while wet sawdust will not absorb the oil readily.

A cleaning powder made of sawdust has been used in Berlin for some time and given good results. It consists of very fine sawdust taken from soft wood, as pine, and is saturated with magnesium chloride, sodium chloride, or some other neutral hygroscopic salts, using glycerine. Then some heavy aggregate is added. which will not discolor the mixture, usually powdered chalk, plaster of Paris, or clay. The mineral matter serves to make the powder heavier as also to loosen the particles in the finished material. In addition some element like starch is used in order to distribute the specifically heavier aggregates like the clay or chalk throughout the mass.

Elements of a Cleaning Powder

In producing the mixture, the various elements are heated in large tanks, and stirred until the water used

for dissolving the salts is evaporated. Great care is taken to prevent decomposition of the salts or congestion of the starch. Then the disinfectant, if any, is added, and the entire mixture ground in very fine mills. The result is a very fine, loose powder, which is always moist, and has great absorbing powers.

The following mixture is used for the above powder: 36 parts by weight of sawdust; 15 to 18 parts of the clay, plaster or chalk; 70 to 72 parts of an aqueous solution of magnesium chloride at 30 to 32 degrees Beaume. To one part of magnesium chloride solution, 2 to 4 parts by weight of starch are added.

Individuality in Carpentry

IN carpentry and building, just as in everything else, there is too much of a tendency to imitate the other fellow in the business and thus put a check-rein on individuality, which is, to say the least, a bad move and one that knocks the carpenter-contractor out of business he might otherwise get, says J. Crow Taylor. The average carpenter, when he becomes free from apprenticeship under someone else and goes into business for himself, instead of planning and conducting his business on a little different or entirely different basis from that of other carpenters, generally looks around and sees how it is done by them and imitates to the dot their work, their methods, their prices, etc. What would seem a better plan would be to go in for building up a business that would be characteristic of himself, in which the credit for success would all be his own, and in which he would build up a reputation for having some enterprise.

It may seem like going pretty deep into the matter, but is there really any credit in imitating somebody, and making a success? It seems like the credit is coming to the fellow who first thought out the way to conduct his business, and not to those who came afterward and merely imitated him.

There is room in building for the carpenter-contractor to exercise his individuality. and bring variety into his work. Anything will grow commonplace if new ideas are not introduced now and then, and if the carpenter in the course of his work thinks out or runs across a new and what appears a better way to do the same work there is no need for him to keep his brilliant ideas to himself and make no good use of them. He should not be afraid to introduce new methods into his work for fear they will prove a failure. One or two failures are no killing matter, and they may eventually be rounded into a success. The censure, if the progressive carpenter has been censured for trying new ideas in his work, will turn to admiration and imitation from others less progressive, for thus it is that the industrial world learned to spell Progress.

Substitutes for Circassian Walnut

The United States, says the Department of Agriculture, is probably the largest consumer of circassian walnut, one of the world's best known and most expensive cabinet woods.

The high cost of Circassian walnut is due to the scarcity of the beautifully figured variety demanded for furniture and interior finish, for the tree itself is more widely distributed than almost any other of commercial importance. The demand for the best wood, however, has always outrun the supply. Even in the eighteenth century, when wars in Europe were frequent, so much Circassian walnut was used for gunstocks that the supply was seriously depleted. Early in the nineteenth century the wood of 12,000 trees was used for this purpose alone. Single trees, containing choice burls of fine bird's eye figures have sold for more than $3,000.

The tree is native to the eastern slopes of Caucasus and ranges eastward to the foothills of the Himalaya Mountains, from which it extends southward to northern India and the mountains to upper Burma. It has been widely planted in Europe and the United States, in this country under the name of the English walnut. The wood grown here, however, has not the qualities demanded by the cabinet and furniture maker. Much of the Circassian walnut now used comes from the Black Sea and from other parts of Asia.

According to a circular just issued by the Forest Service the demand for Circassian walnut has resulted in the substitution of other woods. Our own red gum is often sold as Circassian walnut, and butternut is also similar in general appearance to the less highly figured grades. Many good African, Asian and South American woods resemble Circassian walnut though none possesses the magnificent figure, delicate tones and velvety texture of the latter.

Force of Habit

A contributor of Wood Craft raises a question of much importance to everyone who has to do with machinery. He points out that habit is a good guide to the workman. It can also be a bad guide, as in the case he mentions.

But of the cultivation of safe and sane methods there can be nothing better as a cause of workmanlike habits. Systematic operations, repeated regularly and with vigor, become automatic. There is some danger in one's mind wandering away from the work. No matter how perfectly the series of operations is conducted without any especial effort that the workman could consciously exercise in their performance, and it is easy to recall many skillful workmen whose output is as excellent as it appears effortless in their highly trained hands, yet it is seldom if ever the best plan to wholly divorce the active thought from the task.

Habit is strong. We have an opportunity in the making of habits and we profit or lose by the habits thus made. Out of all the scientific studies of recent years we are coming to realize the more thoroughly how much depends on the formation of good habits and the proper maintenance of sound minds and healthy bodies to carry them into due effect. Let anyone have the misfortune to injure hand or eye and how quickly he finds his habits affected. Slight as may be the injury in appearance it has an influence, and for a like reason the habits are confirmed as customs according to the perfection of the means, the bodily limbs and senses by which they are accompanied. Perfection of habit and perfection of health are thus to be sought because of their dependence one upon the other.

In a report to the Department of Trade and Commerce, J. E. Ray, Canadian Commissioner at Birmingham, England, says that the British trade statistics indicate a decrease in the total purchases of timber wool from Canada of $894,700 in comparison with the previous year, and compared with those of the year 1907 they indicate a total decline of $1,603,585. The total imports of Great Britain, however, were last year $1,725,790 less than the previous year, and $6,154,415 less than the year 1907.

Modern Machines in Woodworking Plants

How Greater Speed and Efficiency Have Been Secured Endless Bed Sander and Feed Roll Sander—Band Rip Saws

THE early mechanic had few tools and appliances wherewith to perform his work, and these were crude and primitive, consisting principally of a limited number of hand-tools brought from the old country and, occasionally, a hand lathe or jig-saw operated by foot power, says Alexander T. Deinzer, in The Furniture Manufacturer. But with their few tools and meager facilities, and animated by the condition that "necessity is the mother of invention," these old-time mechanics proceeded with practical, common sense and ingenuity to design and construct better tools and machines—which have continually developed until we have the splendid array of manufacturnig machinery to be seen in every up-to-date furniture manufacturing plant to-day. The extent to which machinery has cheapened work will be appreciated from the fact that in 1826 the cost of rendering a square foot of surface true by hand chipping and filing was $3, whereas, in 1856 it could be done in the planing machine at a cost of less than two cents. To-day lumber manufacturers will dress 1,000 feet of lumber, charging from 50 cents to $1 for the dressing. In cases where lumber is shipped from a distance, no extra charge is made for dressing, as the saving in weight more than pays for this work. In this article I will try to give information regarding the efficiency of machines so absolutely necessary in progressive plants.

Endless Bed Sanders

Endless bed sanders need no introduction. Inasmuch as these machines have proven their efficiency, there are many furniture manufacturing plants that still cling to the old-style machine. To more perfectly understand the need of such a machine, it is first necessary to understand wherein the old type sander—that is, the roll feed—falls down as far as production is concerned. The fact that the old type sander is a roll feed machine makes it impossible to feed more than four pieces and generally not more than two pieces of average stock through a roll feed sander at one time. This, for the reason that the average stock in the average furniture factory, or anywhere else, varies in thickness somewhat and with a variation of one-sixteenth of an inch, the rolls of this sander naturally would not sand more than two pieces at a time successfully. If the stock is very even in thickness, probably the average feeder could feed four pieces of stock through a roll feed sander at once, but unless it is even, two pieces would be the average feed at any one time. The narrowest roll feed sander made is 31 inches and the reader can readily see that only a very small proportion of the width of this sander is used at any one time in any factory for the above stated reasons. There is then quite an investment that the owner of a roll feed sander is not making good on, as far as output is concerned, and it was in the endeavor to secure greater efficiency or greater output that the inventor of the endless bed sander strove to increase the possible productive end and, at the same time, secure as good, if not better sanding. He certainly has been successful.

The efficiency of the endless bed sander lies in the fact that the entire width of the traveling bed may be filled with stock going through the machine. There may be as much as one-eighth inch variation in thickness of stock and still interfere in no way with the progress of any piece through the machine at any time. The reader will readily see then that on stock such as the average furniture manufacturer has, the endless bed sander has increased the sanding capacity enormously. Take such stock as enters into a bookcase, for instance. The stiles and rails of the doors which, in no case would be less than eight pieces, would all go through at once, where on a roll feed machine probably only two of these pieces could go through at once; at most, four. There is, then, right there an increased capacity of from 50 to 100 per cent. On tests made in one bookcase factory in which a Berlin endless bed sander is installed it was found possible to increase the amount of stock sanded in a given time by about 400 per cent. That doesn't mean that this sander was tested only on narrow pieces, such as stiles and rails of bookcase doors, but every piece of the bookcase that was to be sanded. In the plant of a desk manufacturer it was found that there was an increase in sanding capacity of from 600 per cent. in case of smaller pieces that enter into desk manufacture, to 400 per cent. of the average small pieces. The increased capacity of the endless bed sander then depends somewhat for its percentage of increase upon the size of stock to be sanded, but in any case there would be an increase because of the fact before stated, that the entire width of the endless bed sander is used at all times, whereas, only a small proportion of the width of the roll feed sander is ever used.

The Roll Feed Sander

Where large surfaces are to be sanded, it is better to use a roll feed sander. It is my belief that the ideal sander equipment, where a plant has sufficient work for two sanders, is the combination of a good roll feed sander with the endless bed. This combination works out particularly well in the case of installations of both roll feed sander and endless bed machine for the following reasons: In the manufacture of almost any furniture, there are many large pieces to be sanded. The endless bed sander sanding these large pieces would have no advantage over the roll feed sander. The roll feed has one advantage over the endless bed sander, and that is, there are three spreads of feed which the endless bed has not. Now, consider this possibility for the combination spoken of. It is generally true that the average furniture plant making almost any kind of goods, but especially case goods, desks, bedroom furniture, library furniture and dining-room furniture, has a much larger proportion of small pieces than large ones. This being true, there is need for a larger sanding capacity for the small pieces than for the large. Now, give the small pieces to the endless bed sander and give the large ones to the roll feed sander. In this way the endless bed sander with perhaps from 200 to 500 or 600 per cent. larger amounts of stock to be sanded, is kept fully as busy as the roll feed sander on its smaller proportion of large pieces.

The reader will readily see the advantage in this. Then there is another advantage of having the roll feed in this combination. There are many unexposed parts of furniture and unimportant parts which need not nearly so good sanding as the exposed parts do. This being true, it would seem foolish to spend the same amount of time in sanding these unexposed pieces as for the pieces that require more careful sanding. Remember, Mr. Reader, that the roll feed sander has three speeds of feed which speeds may be varied to suit the manufacturer. Carefully sanded pieces should go through the roll feed machine at 12 feet a minute, where the unexposed parts might be run through at 18 feet a minute. With this combination installed, however, the writer would recommend one faster feed than 18 feet. A prominent concern has its sander speeded up to 24 feet per minute, and it is a good idea at that.

Why the Combination is Good

From the above explanation, I hope that the reader will not only get an idea of why the endless bed sander is more efficient in the average plant than the roll feed sander, but also that a combination of the roll feed sander with the endless bed sander is far more efficient and a much superior method of sanding average stock in average plants than any other method of sanding that has been devised up to the present. But there is again a feature of the endless bed sander which makes it somewhat preferable to the roll feed sander in the average plant, and that is, that not nearly so expert an operator is required on an endless bed sander as on the roll feed. This, for the reason that there are so many parts to be adjusted on the roll feed sander that it requires an expert or, at least, a very well informed man to keep things up to the top notch of efficiency and ability. On the endless bed sander, however, there are not nearly so many adjustments and alignments to take care of the endless bed sander as the expert can of the roll feed machine. A study of the two machines will indicate that this is true. The average machine buyer has probably not taken this into consideration, but it is true, nevertheless.

The Band Rip-Saw

During the past two or three years, furniture manufacturers have begun to take up with more alacrity the use of the band rip-saw in place of the old hand-feed rips. As with a good many new machines, the installation of the band rip-saw adds responsibilities and cares which were not present with the old circular rip working. For instance, there is the very careful attention to the fitting and filing of the bands to be taken into account that does not enter into the use of the old circular saw, but there are features in the efficiency of the band rip-saw which outweigh the cares and responsibilities that the band rip-saw brings into the plant. The first of these advantages that would occur to the progressive furniture manufacturer in thinking of the subject is the fact that a much larger output can be secured. For instance I find that the Berlin band rip-saw is speeded up to 300 feet per minute and experiments show that at that rate the machine does the most satisfactory work. The usual gauge of saws on this machine is 20. Some concerns use a even thinner blade, but the reader will readily see that even with a 20-gauge saw speeded up to several times the capacity of the old circular rip, that there is not only a much larger production, but also a very large saving in saw kerf. This saving in saw kerf is not great and would amount to but very little on average stock, but when expensive furniture stocks are taken into account, it amounts to considerable in the year's work and is to be taken into account. Some of the good makes of machines are now provided with guards and sectional guides. This guide is in sections of various width; that is, the section next the saw might be one-half inch in width and would permit of taking one-half inch strip from stock. The next section would be one inch, probably, the next section one and one-half inches and the next one-half inch again. With this multiple guide as a part of the equipment of the band rip saw, the reader will appreciate that it is possible for a man to rip any width strip from any piece up to 22 inches wide without setting the guide at all, but simply feeding the piece into the multiple guide up to the section which would give him, without any further attention on his part, the proper width of strip to be ripped off.

The larger advantage of the band rip-saw comes first from its larger output ability, second from its saving in kerf and, third, from the very efficient manner in which it is possible to secure different widths of strips to be ripped or to rip stock to get the best out of any piece wanted.

A band-saw blade should, under all conditions, maintain a practically fixed position on the saw wheels. The teeth should project over the front edge of the wheel and the saw should maintain this position without any support whatever on the back edge of the blade. Each tooth of a band-saw blade acts like a small chisel, removing a certain portion of the lumber being sawed. That the tooth may do its work with the least possible strain on the blade, it should be of such form that it will cut freely and not tend to swerve sidewise and follow with the grain.

The Care of Machines

The care of any machine is the life of the machine, as well as a great part of its success. No matter what make one is using, if the machine is abused or neglected, efficient results cannot be obtained. Proper lubrication is absolutely necessary. Lubrication came into use with the first machinery and no way of doing without it has ever been found. When the Indians produced fire by twirling a stick on a block, they unwittingly showed what happens when lubrication is neglected. Speed and continuous motion are entirely dependent on the proper oiling of opposed surfaces. My friend, Mr. M. Everett Dick, chemical engineer for the Buss Machine Company, of Holland, Michigan, contributed an article on the subject of "Lubricating Oil and Lubrication" to The Furniture Manufacturer and Artisan which appeared in the May, 1912, number. Much very interesting and valuable information was given in this paper.

Lubrication is the application or introduction of some substances that will cling or flow between the surfaces of bearings and journals of engines and machinery and keep the metal surfaces from coming in direct contact, thus preventing excessive friction and consequent heating. The difference between the wear on unlubricated and that on lubricated surfaces is so serious that a comparison between the cost of lubrication and the money saving and avoidance of repairs is superfluous. But the difference in wear, when two different lubricants are used is not very great and the proper choice between the two lubricants depends on a comparison of their cost with the amount of working power they save from dissipation.

Viscosity is the quality of stickiness or resistance

to internal movement, and in its use for lubrication that oil which offers the least resistance to flow within itself, and which is heavy enough for the work to be done will be found to be that which will allow machinery to be run with the lowest co-efficient of friction.

If a bearing is to run well and without heating, there must be a film of oil between the running or bearing surface. Second, there must be room between for such a film of oil, and third, the oil must be introduced between the bearing surfaces and, of course, kept there.

The Use of the Orders in Woodwork

IN dealing with the classic Orders of architecture, as far as cabinet work and joinery are concerned, we shall only need to study three—the Doric, Ionic and Corinthian. If the cabinet maker is conversant with the dimensions of these he will be able to set out any classic Order from a rough sketch, the only dimension which he will need being the total height of the column, including the capital and base. There are, as our readers probably know, excellent books dealing with the setting out of the Orders in great detail published for the use of architects, but these do not help the cabinet maker very much, for when the Orders are reproduced in wood to a small scale very much of the detail is eliminated. For instance, the entablature of the Corinthian Order, consisting of architrave, frieze, and cornice, in a large building is often several feet deep and crowded with detail. This, of course, has to be very much simplified when it is reproduced in wood to a very much smaller scale, say three or four inches deep.

Superposition

In setting out the Orders it must be remembered that the Doric is stouter than the Ionic, and that the Corinthian is more slender and graceful than the other two. In some interior work—mantelpieces, for instance—we often meet with a design with columns below the shelf and columns above. In such cases the stouter Order should always be placed beneath the lighter one. If the Doric Order is used below, the Ionic or Corinthian should be employed above it, and it would be a distinct failing in design to support a Doric column by an Ionic or an Ionic by a Corinthian column. In a composition three storeys high the rule of superposition lays down that the first storey should have Doric, the second Ionic, and the third Corinthian, reckoning from the ground upwards. This rule only applies where one or more of the Orders is used in the same decorative composition, and where only one set of columns is employed the designer can choose either one of the three, according as his fancy or the limitations of the design dictate. Another point to remember in the use of the Orders is their essential stability. In many of Chippendale's Gothic bookcases, for instance, when the doors were opened clustered column pillars swung out with the door from under the entablature. Such obvious absurdity should be studiously avoided. Another point to remember in architectural compositions is that projections go over projections. For instance, if one column is superimposed upon another the center line of the one above should be identical with that of the one below.

Entasis

If a column is turned with its two sides exactly parallel, so as to form a perfect cylinder, it has the appearance of being smaller in the center than at the ends, and to do away with this optical illusion the Greek builders slightly swelled their columns and made them smaller at the top than at the bottom. This gentle curve of the columns is called its entasis. In the small work which cabinet makers handle it is hardly necessary to go into the elaborate calculation used by a builder for a large stone column, and the following simple rule will suffice: The column at its upper extremity measures 5-6 of its lower diameter in each of the Orders—Doric, Ionic, and Corinthian. To obtain the necessary curve, divide the height of the column into three parts, and in the lower third the sides of the column are exactly perpendicular. To obtain the gentle curve for the upper two-thirds, a long lath of mahogany is generally used about 2 inches wide and 3-16 of an inch thick. If this is grasped firmly at either end it may be slightly bent to the required line, and an assistant may use this as a guide for his pencil in drawing the curve.

The Doric Order

It is now proposed to describe in the simplest possible way how to set out the main dimensions of the Orders. It is only necessary to have one dimension fixed. The cabinet maker must know the height of the column, including the capital and base. Let us suppose the height between the lines A B and C E (Fig. 1) is 3 ft. 4 in. = 40 in. Having settled on the height of the column, the next dimension to be obtained is the lower diameter. This is an easy matter, for in the Doric Order the column is eight diameters high, in the Ionic nine, and in the Corinthian ten. For the Doric Order, therefore, we have to divide the column (3 ft. 4 in. in height) into eight parts, one of which will give us the dimension of the lower diameter, which in this case is 5 in. The base is ½ D = 2½ in.; the projection of the base is ¼ D = 1¼ in.; the capital is ½ D = 2½ in. The upper diameter equals 5-6 D, and the entablature is 2 diameters, or 10 in. in height. This, in its turn, is divided into eight equal parts, two of which are allotted to the architrave, three to the frieze, and three to the cornice. The projection of the cornice equals its height; that is to say, if a line of 45 deg. be drawn upwards and outwards from its lowest point, that would give the general outline of the moulding.

It is not usual to flute a Doric Column. It should be noted that in each of the Orders the frieze is that part of the entablature to which decoration is applied; neither can too much stress be laid on the point that the line of the frieze is in all cases in the same plane with the line of the top of the column (see Fig. II.).

The Ionic Order

The Ionic Order is worked out in a very similar way, but the column is rather slighter, owing to the fact that the Ionic is 9 diameters high instead of 8 as in the Doric. Again, take the height between A B and C E (Fig. 1) as 3 ft. 4 in. Divided by nine this is just about 4½ in.; 4½ in. is therefore, the lower

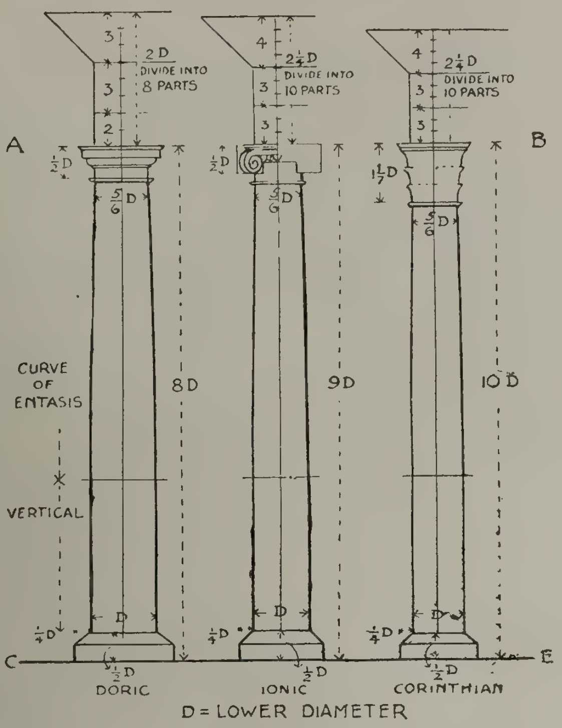


Fig. 1

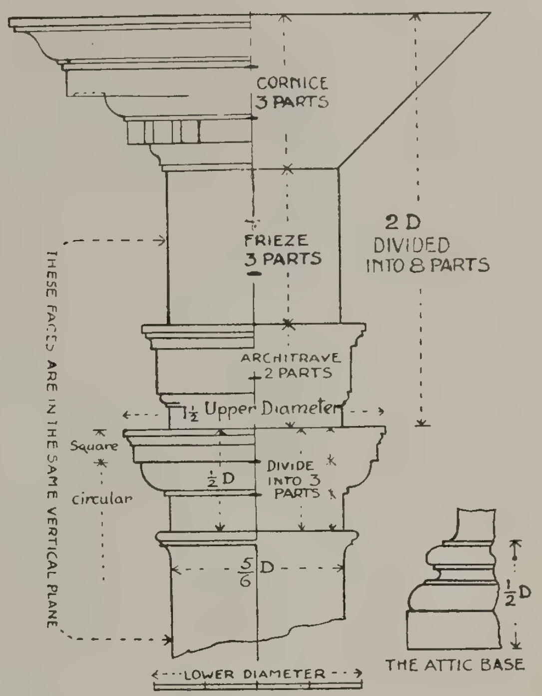


Fig. 2

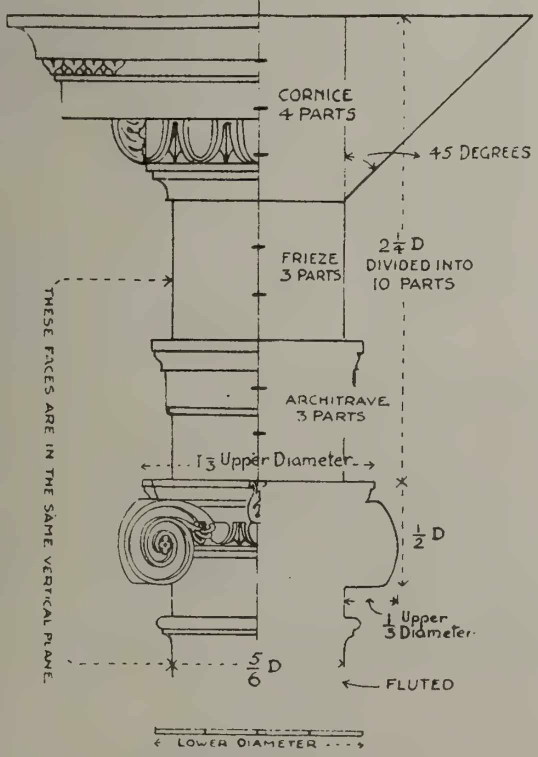


Fig. 3

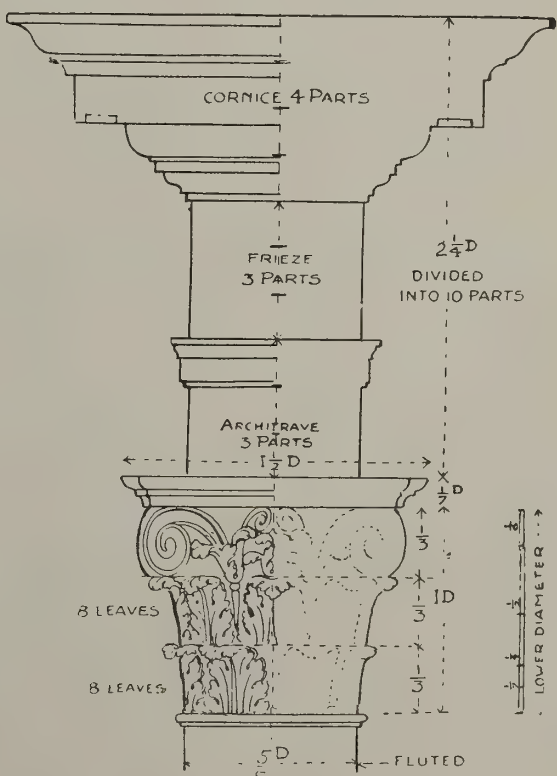


Fig. 4

The Use of the Orders in Woodwork

diameter—which is abbreviated in the diameter to "D"—or the unit of measurement. The base, as before, is ½ D, upper diameter 5-6 D. The entablature, 2¼ D is divided into ten parts as follows: Entablature 3, frieze 3, cornice 4. The Ionic column may be either plain or fluted.

An Ionic cap may be formed in two ways—either with a curved abacus and the volutes standing diagonally when viewed from the front, or the caps may take an oblong form. The curved abacus is the most graceful form for woodwork, and the one generally employed by high-class cabinet makers and joiners. The curve of the abacus may be obtained in the same way as shown on Fig. 5 in connection with the Corinthian Order.

The Corinthian Order

We come lastly to the Corinthian Order, and the main dimensions for this are also given on Fig. 1. In

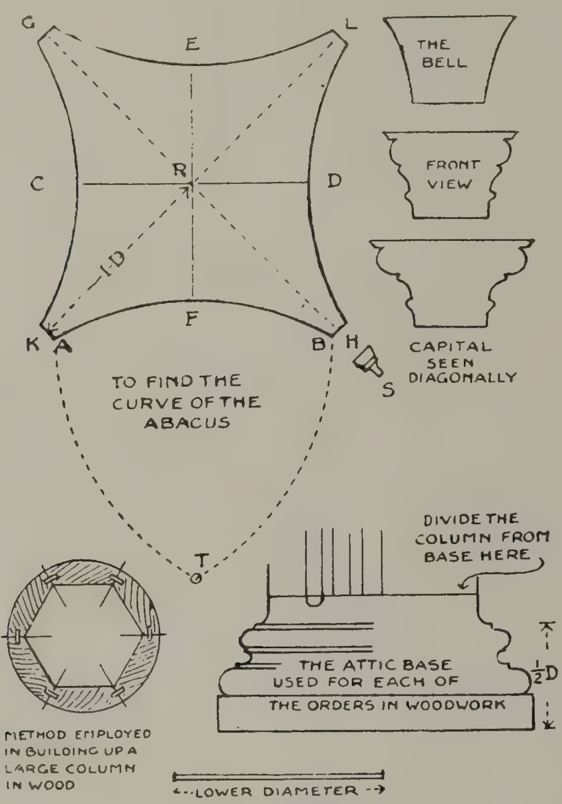


Fig. 5

this Order the column is 10 diameters high; the lower diameter, therefore, measures exactly 4 in. The capital is 1 + 1-7 D high, 1-7 of which is taken up by the curved abacus, and the bell is divided into three equal parts (as shown on Fig. 4). The Corinthian capital is decorated with sixteen leaves, eight in the first tier and eight in the second, arranged as shown, and a volute under each of the corners. The way to set out the curved line of the abacus is shown in Fig. 5. Draw C D and E F at right angles to one another; bisect the angles in the center by lines G H and K L. From the center R measure off one diameter on each of the diagonals, and the points obtained will give the extremities of the abacus. Cut off the corners of K G L and H, being careful to allow sufficient width for the moulding, which diminishes towards the bottom (see S). Then with center A and distance A B describe the arc B T, and with center B and distance B A describe the arc A T. Let these two arcs meet in T, and with center T and the same radius describe the arc A B. This gives one side of the abacus. Proceed to draw the curves on the other side by the same method.

The small sketches in the top right-hand corner of Fig. 5, if studied, will serve to prevent a mistake which is frequently made in the cutting order by cabinet foremen. The draughtsman sometimes omits to give a plan of the capital and abacus, and the foreman measures up the stuff required for the carved capital from the front elevation; but, as will readily be seen by measuring the drawing, the distance G B (see plan of abacus, Fig. 5) is considerably greater than the distance A B. The block of wood supplied for the capital is thus too small unless the diagonal dimension is taken into account.

The Building Up Of Columns

In the joinery work the columns are sometimes of considerable size, in which case they are built up as indicated in the bottom left-hand corner of Fig. 5 in order to prevent any possibility of splitting. To save material, the base is turned out of a separate piece, the joints being made at the point X. The column is fluted before the base is fitted on, and when this has been done the semi-circular finish is given as at Y by the carver. This method ensures absolute accuracy. The necking mould just below the capital itself is turned on the shaft of the column. The base shown in Fig. 5 is what is called the Attic base, and it is used indiscriminately both for the Doric, Ionic, and Corinthian Orders in woodwork. It must be remembered that in some of the historic styles, notably in Jacobean and Elizabethan times, the Orders as used by the English workmen before they thoroughly understood the Renaissance detail were very crude. The width of the Ionic capital, for instance, was sometimes out of all proportion to its height. Squat columns were used, and the entablatures and other details lost all sense of proportion. It is this quaintness and lack of nicety in proportion, coupled with a certain artistic sense, which lends to the early woodwork in this country its peculiar charm, and it is those variations which should, of course, be studied by the cabinet maker who is reproducing the work of that period.

Then, again, there has been considerable variation in the carved detail of the capitals at various periods in the Ionic and Corinthian Orders. For instance, some of the Georgian designers developed a florid style of capital which differed very much from the precise detail found in the Louis Seize work at the Petit Trianon. But these, after all, are questions of style, and the object of this chapter has been to set out as clearly as possible the main dimensions of the three Orders. All complicated measurements have been studiously avoided, and if the cabinet maker follows the simple rules enumerated above he will escape the errors in proportion which are most frequently made.

In conclusion, the mouldings which are drawn in connection with the three Orders are merely suggestions, and may, of course, be varied according to individual taste.

The Ypsilanti-Reed Furniture Company, Ionia, Mich., an institution adjoining the state reformatory walls, and in which convict labor was largely employed, was destroyed by fire recently at a loss of $265,000. The state lost $100,000 worth of equipment in the factory. The origin of the fire has not been determined.

The Cause of Defective Veneer Work

By C. M. MacKay

EVER since furniture making has been numbered among the arts, furniture workers have had more or less trouble because of the standard of quality demanded. In the old days when a man cut a block from a large tree and made a table of it by turning it on end, and then made seats by cutting blocks from smaller trees, the artistic taste in humanity was not so highly developed, and slight imperfections were never noticed. Everything was in perfect harmony. The rough, uncouth man had his rough, uncouth furniture, and was happy.

But times have changed, and man and his tastes have changed also, until to-day the best that can be produced is demanded by the average buyer of furniture. What would have at one time, and not many years ago, been considered of no moment, would today be looked upon as hideous defects. And these troubles have not been decreased by the scarcity of lumber which has brought veneered work prominently to the fore.

Almost every factory manufacturing a line of veneered furniture has had its share of trouble with this class of work, and many manufacturers have, after a few months' experience, almost decided to cut it out. But there were men who believed that from veneer there could be built up the very highest quality of furniture, and their faith in this class of work has been justified by the result.

Ignorance of Materials

Nearly all the troubles experienced by the makers of veneered furniture have been the result of ignorance of the nature of the materials used. When a defect developed in a piece of veneered work ignorance of the nature of the materials used led those, whose business it was to ascertain the cause of the trouble, to believe that the cause lay in close proximity to the place where the trouble was discovered. This led to many changes in the method of handling and finishing veneered work, but without benefit to the work itself, because the source of the trouble was not there.

It frequently happens that goods reach the finishing room before defects in veneered work are detected. This is not because the defects are not present before the goods go to the finishing room, but because the conditions favorable to their detection are not present. Suppose a lot of stuff has been veneered and very hot coals had been used in the process which burned the life out of the glue beneath the thin face veneer. A batch of goods like this might pass through the machine and cabinet departments without showing a trace of anything wrong. Now, suppose it is mahogany veneer, and the goods are sent to the finishing room and stained with a water stain. At once the veneer is seen to raise in places in the shape of blisters, and some one at once lays the blame at the door of the water stain.

To the mind of the man who has looked deeply into these matters and has learned to distinguish between cause and effect there would be no reason to condemn the water stain. Men who know the nature of glue know that when it is once properly set it is pretty difficult to make it lose its grip. The man who has laid a piece of veneer by mistake knows that it can not be loosened by the application of a brushful of water. Quite frequently steaming has to be resorted to in order to accomplish the desired result. Had an oil stain been used instead of a water stain, the probabilities are the defects would not have manifested themselves quite so early in the process of finishing, and perhaps not been detected until the goods were varnished or were being rubbed out. But this would only serve to make the problem more complicated, because the further the goods are removed from the cause of the trouble the more difficult the cause is to discover.

I remember a shop that experienced considerable trouble with loose veneer, and the management became determined to ascertain the cause. The trouble was usually with the crossbanding coming loose from the corestock, and was seldom detected before it reached the varnish room. The slightest unevenness is easily detected in a varnished surface, and when the varnishers saw anything suspicious looking they would tap the spot with the finger and the sharp "click" as the loose veneer struck the core-stock would betray the defect.

All this time those responsible for the veneering had been contending that the trouble was caused by some kind of dope that the finishers were using; and the finisher, though satisfied that the fault was not in his department, could not satisfy the powers to that effect, and was, therefore, having a hard time. One day the manager, while passing through the shop, saw a man sponging with cold water some mahogany veneered work. At once the manager went up in the air. He was the cause of all the veneer troubles—the thing for which the manager had been searching all these months. In vain did the finisher protest that the water did not penetrate half way through the face veneer, and therefore could not have loosened the glue which lay beyond the crossbanding. The edict went forth and sponging was placed under the ban. But the blistering did not stop. But some time afterward the finisher was in the veneer room talking to the veneer man when a truck load of table tops came in to be face veneered. The finisher rested his arm on the top of the load, and as he talked he began drumming on one of the tops with his finger tips. Suddenly the "click," "click" struck his ear and he examined the top more closely. He drew the veneer man's attention to it, and together they examined the whole load, and found a large percentage of them defective. This load of tops had just come from the machine room, where they had been run through the sander. They then examined a load that had not yet been sanded, but these seemed to be all right. This load was then sanded, and when examined afterward many of the tops were found to be defective.

What was the cause? The stock had been taken from the press and sent immediately to the sander. The cross-banding, not being very thick, the rapidly revolving drums of the sander had heated the soft glue beneath, allowing the veneer to come lose.

The proper way to handle veneered stock where the crossbanding and face veneer are laid in separate operations is to pile the stock away after the crossbanding has been put on, until the glue has had time to harden. Where this is done trouble from this source will never be experienced.—The Furniture Worker.

Practical Work in the Planing Mill

Hints on Door-Making in the Various Styles

LOOKING at the construction of a door, it does not, at first glance, seem a very difficult proposition to make one. However, when one comes in contact with this part of mill work it becomes apparent that it is not always quite such an easy matter. Especially is this true in a mill which does considerable jobbing. A writer in the Woodworker states that he has come across some very puzzling propositions in sizes. For example, somebody ordered a front door, say 3 ft. by 6 ft. 10 in., 1¾ in. thick, having one light 28 x 48 in. This person has seen a door somewhere which has appealed to his taste, and therefore would like to have one like it. This is, of course, very reasonable if it were not for the fact that he did not take into consideration that the other door was higher than the one required. The door desired is to have one panel at the top and one at the bottom. A door which is not higher than 6 ft. 10 in. will not allow of a cross-panel at the top, for the reason that the upper panel would obstruct the view; the distance from the top to the glass should not be less than 15 in. It is evident then that the top panel must be cut out. The width of the glass desired being 28 in. and the door being 36 in., would only allow of 4 in. wide stiles, which is not enough for a front door, because it will not allow of a heavy lock being used. The stock for front door stiles should not be less than 5 in. width.

In this case all kinds of trouble have developed in the making of this door, because the party ordering was not conversant with the requirements. It appears, therefore, that the making of a door is some trouble after all. Of course, the door could be made as ordered, but no end of difficulty would develop if it were so made, and the mill man would be blamed for it. This is not an exceptional case, for it has often come under my observation.

There are several things, therefore, which must be taken into consideration in the making of a front door, most important of which are, do not bring the upper panel below the line of vision, nor make the stiles less than five inches wide from the glass line.

Study the Requirements

Another case which happens often is where the glass size is given in height, and also the panel arrangement, and when ou start to lay off you find that the size of the glass is too long for the required panel effect. Of course, these difficulties will not arise so easily if one takes the order who understands the requirements thoroughly; but the trouble arises from the fact that the order may have been sent by letter from somebody who does not understand the subject in such a way as to properly do the work.

Another error, which may occur with almost any carpenter, is in ordering a number of doors of the five-panel arrangement now very extensively used. Among these there may be some which are only 20 in. wide. It will be apparent at once to the door man that this width will not allow of a five-panel arrangement, but should be three panels, such doors being of the same height as the five-panel doors.

It is not practical to make a five-panel door less in width than 22 in., in order to harmonize with the others, whose stiles are 4½ inches wide, as a rule. In trying to make a five-panel stile for a door which is only 20 inches wide, we find that the two stiles and the mullion added together make 13½ inches, leaving only 6½ inches for two panels, which would look very bad, to say the least.

The glass sizes for five-panel doors are always standard, being 34 in. high for 6—8, 36 in. for a 6—10, and so on; these sizes are always adhered to in our mill. By cutting out the upper two panels and mullion, it is easy to convert a five-panel door into a front or rear door with one light.

The 4-panel door

Another variety of door is the four-panel style, also used quite often. In this the top rail is the same width as the stiles, the middle and bottom rails being 9 in. wide. The distance from the bottom to the top of lock rail is three feet—that is, to the plow—so that in case the door should be changed to have glass in the upper part, it would leave a regular size opening for the glass. Of course, it sometimes happens that a door is to be of an even height, in which case the lock rail should be changed to allow of a regular size glass being used. However, these cases do not often happen.

In making a five-cross-panel door the rails are of the same width as the stiles, except the bottom rail, which is usually 9 in. wide. The panels in a cross-panel door we usually make of a uniform width. If a one-light door is required in this style, we usually take out the upper two or three panels, and if this gives an uneven size glass, the panels are laid out so as to make the glass size even. This slight deviation in height will not be noticed among the other doors.

Dresser doors, or any of the smaller kinds, are also a troublesome proposition because of the many odd sizes that are required. There is a certain rule in the making these small doors, to which one always adheres unless there is a detail requiring a certain arrangement. If a door is 18 in. or wider, we make it two panels in width; if 17 in. or less, one panel in width, using 3 in. stiles, top and middle rail and mullion, and a 6 in. bottom rail. If a door is 3 ft. high or less, one panel in height is used. If it is over 3 ft. in height, we make it two panels high, placing the middle rail from the center down.

The sliding door, usually used between two rooms, is the next problem, and is also somewhat difficult because the various contractors have different rules in studding up for these doors, and the man who measures up for the mill is sometimes in doubt as to how wide he should make the stile which goes into the partition, also the head rail.

In case of the double sliding door we make the back stile and top rail one-half inch wider than the meeting stile. In the single door both stiles and top rail are made one-half inch wider, so that when the door is closed it shows the same width of stock all around.

Last, but not least by any means, comes the batten door, the kind usually used for the outside of factories, stables, etc. Of these there are also different styles of construction. In many cases we make the frames

of $1\frac{1}{8}$ in. stock and the backing of beaded boards. If the door is 3 ft. wide or less the beaded boards are put on vertically and no braces are used. If wider than 3 ft. the braces are used. In case of a double door there is only one brace used in each panel, the highest point toward the center of the doors, so as to bear the weight and prevent sagging. Often the beaded back is put on diagonally, which makes a very strong door.

Then there is the shop door, made of $1\frac{3}{4}$ in. stock, with beaded panels placed in the center in a plow. These doors should be made with the lock rail placed 3 ft. 6 in. from the bottom up, the stiles and top rail being 6 in. and the bottom and lock rails 9 in. in width. The braces are usually made $4\frac{1}{2}$ in. wide, and this rule we always follow where there is no detail given. Of course, if the doors are very large, everything is made larger in proportion, the stiles sometimes being 12 in. to 14 in. wide. This, however, does not often occur except in railroad jobs for roundhouses. The railroad company usually furnishes details for these doors, which must be closely adhered to.

Another kind of shop door, and one which is very often used, is the kind with a number of small lights in the upper part. A cheap way, and also very satisfactory one, is to frame the lights up of mullions which are of thinner stock than the door. For instance, if the door is to be $1\frac{3}{4}$ in. thick, we use $1\frac{1}{8}$ in. stock for the glass frame. Another method is to make a sash which is raised the same as a panel and made to fit into a plow; but this is more expensive than the first.

A sharp tool is a sharp argument for higher pay, and when in proper hands is sure to prove convincing. Sharp men who are good workmen, and are near neighbors, soon get on "top" and demand high wages, and get them.

The superintendent who comes through the workrooms with a cheery smile and an encouraging word for every one, gets more results than he of the scowling visage, and everybody feels better while getting the results.

See that your tools are in good trim, always ready for use; and see that the tools are so clean, and polished, that they show the gentleman that is in you.

Epitaphs in the Cemetery of Failure

He lacked tact.
Worry killed him.
He couldn't decide.
He lacked stamina.
He had no reserve.
He was too sensitive.
He couldn't say "No."
He was almost a success.
He clung to his prejudices.
A little success paralyzed him.
He was strangled by selfishness.
He did not guard his weak point.
He was too proud to take advice.
He did not fall in love with his work.
He didn't read The Canadian Woodworker.

Old Saws and Otherwise

Tough Indeed

Employee—"I should like more salary. I am going to get married."

Employer—"Sorry, but I'll have to reduce it. I am going to get married myself."

A Tall Building

Laborer—And have they tall buildings in America, Pat?

Pat—Tall buildings have they? Faith, Mike, the last one I worked on we had to lie on our stomachs to let the moon pass.

Not Yet

Mrs. Brown could only buy two aisle seats, one behind the other. Wishing to have her sister beside her, she turned and cautiously surveyed the man in the seat next. She finally leaned over and timidly addressed him:

"I beg your pardon, sir, but are you alone?"

The man, without turning his head the slightest, but twisting his mouth to an alarming degree and shielding it with his hand, muttered:

"Cut it out, kid; cut it out—muh wife's with me."

The Affectionate Father

The young mother went upstairs one evening to make sure that her little son was safely sleeping. As she was about to enter the bedroom, she observed her husband standing beside the crib, gazing earnestly at the sleeping child.

Touched at the sight, the mother hesitated a moment; her eyes filled with tears. "How dearly John loves that boy!" she thought.

Her feelings changed suddenly, however, when her husband turned to her and exclaimed, "Mary, it gets my goat how these furniture makers can get up such a crib as this for three dollars and sixty cents."

"Dear (?) Sir"

THE American War Office has, we understand, issued instructions that in future its officials shall omit compliments from ordinary communications. Thus, the having "honours to be" and so forth are to be taboo, and neither elaborations nor trimmings are to be appended to War Office epistles. Curtness and brevity are to be the order of the day, and the saving will, it is said, be quite an item in the year and will mean a big reduction on the next estimates. We certainly think that much useless matter might with advantage be eliminated in our correspondence. The "dear" at the beginning of a letter means nothing, while the "Yours faithfully," the "Yours obediently," and so on, have really no application at all. Another point deserving of consideration is the prefixing or suffixing of "Mr." or "Esquire." Why not do away with both, and call a man by his name? Much confusion and heart-burning are caused by their use, for the terms have now no significance beyond a merely complimentary one.

The Coming of the Band Rip Saw*

THERE is a well-known saying on the subject of the undesirability of confining one's diet to pastry. Plain, substantial food is required by the average person, and the fancy stuff is a good thing to eliminate, or to use in small quantities. Somewhat similar to this condition is the use of machines which are designed for one particular class of work, but which are used for other kinds of operations for which the everyday equipment is better suited.

Coming down to the point, a sawyer who usually has good ideas on the subject of wood-working said not long ago that he thought the band rip saw would one day be used exclusively for that class of work, and that the planing mill or factory which had ripping to do would abandon the circular saw in favor of the other type of tool.

"Look at the saw mills," he said. "Formerly the circular saw was used exclusively, but when the band saw came on the market and manufacturers found that they could, as a general thing, produce a better class of lumber with them, they were adopted. While circular saws are still used to some extent, the big, high-class mills use band mill equipment almost altogether. It has been the tendency of the times to get improved equipment, and that accounts for the place taken by the band saw in the mill end of the business.

"Now, the band saw has come into use for ripping purposes, and the planing mill operator, furniture factory owner and others in the wood-working field have seen that it possesses advantages for certain classes of work. But why not extend its operations and secure those advantages in every class of ripping? The arguments as to accuracy of work and elimination of material loss hold good throughout the whole proposition.

"When you consider the amount of sawdust that is made by the circular saw, and figure the cost of the lumber that is destroyed in this way, and remember that 50 per cent. of this, at least, could be saved by the use of a band rip saw, there doesn't seem to be any good reason why this tool should not be given a bigger place in the factory than it is to-day."

This particular sawyer happens to be a "fan" on the subject of high-grade work. He is a fine type of artisan, who believes that nothing should be done unless it is done just as well as possible. He has no patience with the idea of making shop methods conform to competitive conditions or market requirements, but stands for the ideal of the best possible work on every job.

Consequently the accuracy and high-class production of the band saw appeal to his sense of the fitness of things, and he would like to use the machine every time he has a board to rip. He doesn't stop to think of anything except the quality of the output and the saving in material, and does not analyze the cost of production or the other factors which must be considered. Hence his appeal for the universal use of the band saw for ripping purposes, while based on a correct theory, is not sound when it comes to a question of practice.

In the first place, everybody who has used a band saw knows that the same volume of work cannot be done with it as can be accomplished with an ordinary rip saw. In the case of most planing mills a band saw will not turn out much over 50 per cent. of the work that can be realized from the use of a circular saw, and consequently, when power expense, the time of the operator and other expenses are considered, the cost of performing that particular process is seen to be out of line with what the work can be done for. And the planing mill man realizes that he must get in line to stay in business, and that if he piled expense onto every part of his plant operations, he would have to call for the business doctor in a hurry.

Then, again, a band saw is more expensive to install than a circular saw. If it breaks, the loss to the plant is greater. Meanwhile the initial expense is larger ,and the interest on this investment must be included among the overhead charges which are assessed against the output of the plant.

The band saw is a more delicate tool than its sturdier cousin, and is just that much harder to take care of. It requires more time and labor to keep it in condition, and the filing and swaging are such extended operations that if a filer had nothing but band saws in his plant, he would have to call for help in keeping his equipment up to standard.

These considerations are not criticisms of the band saw, for everybody knows what an essential in the operation of a wood-working factory they are. For heavy work they operate to the best advantage, and cannot be approached, and in work where accuracy is the big consideration they help to make many a job 100 per cent. good. And the planing mill superintendent who finds that he is able to use many a scant board by running it through the band saw, whereas he would have had to use two if the circular saw had been used, on account of the loss through sawdust, is not likely to regard it as superfluous.

In the case of unusually expensive material, as, for instance, in the manufacture of solid mahogany furniture, where the cost of the material is unusually large, it is conceivable that the saving in sawdust would more than make up for the added expense of ripping, and that for that reason it would be desirable to do all of the work on that machine.

Thus the band saw in the planing mill and elsewhere fills a long-felt want, and is certain to increase its hold on the trade. But it is not likely to drive out of business the consistent, useful and dependable circular saw, which is doing its work well and which is rapid as well as efficient.

*By Geo. C. Davis, in The Woodworker.

Superintendents should never walk leisurely through the plant—it has a bad effect on otherwise efficient help. One superintendent makes it a point to rush from one part of the plant to the other. It not only saves him time and increases his own capabilities but it encourages his men to speed up. There is a great deal in suggestion.

The new G. T. P. Fort Garry Hotel will be finished, according to the contractors, about the latter part of June, when the installation of the furniture will commence. Every care has been taken in the design of the woodwork and furniture so that there shall be harmony in every detail. The woodwork is to be in mahogany with walnut finish, this, according to Mr. Bergman, manager of the G. T. P. hotel system, being the first attempt of its kind. Mr. Bergman states that the Fort Garry Hotel will be larger and more up-to-date than the Chateau Laurier at Ottawa.

Suggestions for Shop Practice

WITH the advent of cheap power there is a very marked tendency among contracting carpenters to add wood-working machinery to their plant. A combination rip and cut-off saw, a band saw, sticker, pony planer, and jointer, seems to be about the extent of the general investment, whether it will pay in the long run remains to be seen. I have spoken to several, and they are hopeful that by buying their material in car lots enough can be culled out to do general joinery work. Then on wet and stormy days surplus labor can be utilized to advantage. Some I know made all their frames last winter for this season's work, and again where only one or two pieces of work are wanted or those of odd size and shape, they are knocked off hand instead of waiting to have them shipped from a larger establishment.

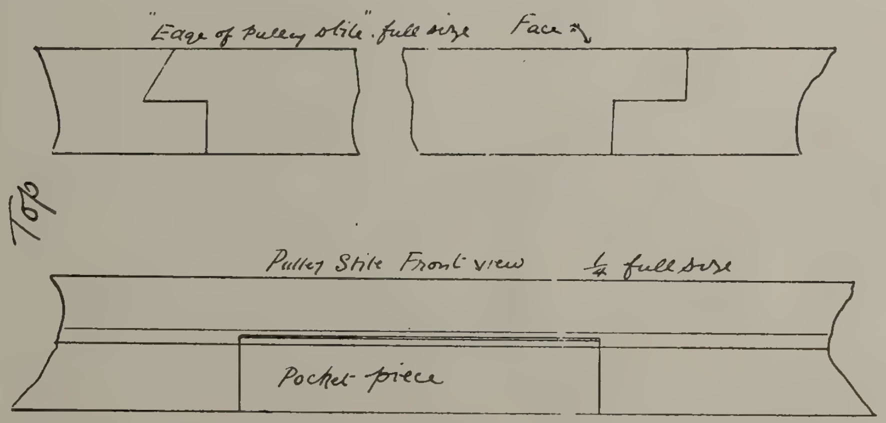
In the accompanying cut will be found a much better way to cut pockets for frames than the usual way—(this refers to those who have no machine for cutting them, and hundreds are still cut by hand). The usual way is to make two long bevelled cuts the length of the pocket—apart in the pulley stile. Then the pocket piece drops out. To fasten in again two nails are driven into the top bevel on pulley stile endwise about half its thickness to centre line of nails. Then two grooves are put into the back of pocket piece with chisel or parting tool to receive nails. Then pocket piece is inserted and a rap or two with the hammer is given to it at the bottom end on the face side which forces it up into the nails snugly. Then a screw No. 9 or 10⅞ is put through bevel at bottom end, and the pocket is firmly in place, but it stands above the surface of pulley stile owing to material being taken away by making bevelled cuts. This must be jacked and smoothed off before it is complete.

This is a process both tedious and expensive inasmuch as it wastes time and material. Here, in the cut you have an idea that will save. I know by actual practice, in time alone, three hundred per cent. After you have satisfied yourself that it is a better way, and I am sure a little practice will convince you, take a piece of board about 5 or 6 feet long and 7 or 8 inches wide. Nail or screw one one side a strip about 1 in. x ⅞ in. Then at convenient intervals tack a block or two the same distance from the strip as is the widths of pulley stile. Now you have a board that will last you with careful usage as long as you want it.

Now then a batch of frames is wanted right off, bricklayers are waiting, and we all know what that means. I won't put it down here, (I might be in jeopardy of getting six months). Take down your board. Tack to bench. Take pulley stile, the cut in parting strip groove having been previously done on rip saw. Place pulley stile on board. It is held firmly by strip and blocks. Take a small-back saw, about 7 in., usually termed a dovetail saw, and about 8 in. up from bottom of pulley stile, put a square cut from inside edge to parting strip groove. Cut under a little so as pocket piece will clear nicely on being removed. Then decide on lengths of pocket which will be determined by size of frame. Make the top cut square across same as before, but bevelled well under. Both of these cuts will be half thickness of pulley stile in depth. Turn over end for end and about ⅝ higher than the cut at bottom on face put in square cut half thickness down, and at upper end put in cut ⅝ lower down from face cut. That is all there is to it. Your pocket is cut and no nail or screws or facing off are required.

Be careful about cuts at lower end to give clearance, because the longitudinal face line of that pocket piece is really the radius of a circle and the cuts, if they were square down, would be tangents and would bind and therefore are cut under to conform to the circumference.

Now a word as to removing the pocket piece it will be observed that the only thing holding is the short grain between cuts, which can be readily broken by a slight tap with the hammer at lower end on the inside, which is best done after frame is together and before back lining is put on. But if it is forgotten, it can be easily done by the man who is about to hang the sash. Remove parting and inside beads. Insert wide chisel in groove and pry outward at the same time giving a smart rap or two at bottom, when it will be found to break off with ease and the parting and inside beads hold it firmly when replaced. I can safely say by practical experience this is much the better way and you can cut your pockets like cracking nuts, and a great deal quicker than some nuts we have to crack.



A practical suggestion in shop work

Uniform Mill-Work Lists

By Chas. Cloukey

THE above caption is intended to refer to the uniform listing of mill-work from sets of plans as furnished by architects, and not to uniform details of different jobs.

One might think it an easy matter for any number of mills to make lists just alike from the same plans and specifications, and considering the high class of workmanship employed in listing and estimating, it would seem that if the estimators are able to get the same items, on their respective lists, there must be something the matter with the work of the architect.

A long experience with the work of architects in different parts of the country leads me to believe that a good share of the uncertainties encountered in making lists result from a peculiar attitude of the architect toward the work to be done by the contractor and his subs. We find in many cases the architect is indifferent about certain details and materials, and will not go to the trouble of minute specification. For instance, he may say that certain parts are to be made of pine and does not specify the quality, and perhaps the only clue to it may be found in the specification for painting and finishing which says that certain rooms are to be painted, certain rooms stained and certain others to be finished in the natural wood. One mill may figure a No. 1 common finish for the paint, clear sap for the stained wood and clear for the oil, and then for fear he should be forced to furnish better stuff for the paint, he adds a small per cent. in the way of insurance.

It is a common specification with an architect to say that "all materials must be the best of their respective kinds." Now, if the finish for paint had been specified No. 1 common, or D stock, every estimator and mill foreman would be free from doubt as to just what was wanted.

It is a common occurrence to find that the thickness of doors is not mentioned in a set of plans and specifications, and this leaves the estimator in much uncertainty; perhaps he will list all the outside doors 1¾ and all the inside doors 1⅜; perhaps another mill will call all of the inside doors 3 feet wide and over 1¾. In case an architect specifies doors of 2 inches in thickness, one mill may list them as 1¾, while another will list them 2 inches and price them as 2¼ thick.

Now, it is not expedient to multiply the record of a thousand and one instances where the estimators and listers come to a parting of the ways, for we who are interested in this matter know pretty well what they are. To place the responsibility for the trouble is another thing, and to bring about its practical abolition is decidedly still another.

It has been suggested that the architect furnish a complete list of mill work with his set of plans and specifications, and so eliminate part of the expense of estimating. If it is a fact that 5 per cent. of the cost of mill work is represented in the making of estimates, it would cut it down considerably if the work of listing could be side stepped. Then, again, if the list furnished could be considered as absolutely reliable, the items added for uncertain "miscellaneous" which sometimes are as high as 5 per cent., could be eliminated entirely.

The logical inference is that this would be a material saving for the builder, as the competition among mills would keep the price down in relation to cost. But let us see how it would work out in practice. In the first place, the architect would not do the extra work without an extra charge, and this would consume at least a part of the saving contemplated, if the professional services of the architect did not take it all up. Also, it is not reasonable to suppose that any assistant in the architect's office would be more liable to make a list of mill work free from error than would an estimator in the factory office. Aud while such errors would not necessarily cost the mill man anything, they would cost the contractor or owner something unless the loss could be recovered from the architect. In case the architect was held for the mistakes in listing, he would add a percentage to his charges to cover the same just as the mill man does. If the contractor had to stand the loss of error he would also figure higher.

It stands to reason that if a specification is so lax that a man of experience cannot tell what it means, a mill-work list made by the same office would be liable to lack in particulars of quality and detail even if it was absolutely correct in sizes and quantity. This would mean delay or adding the extra per cent. to cover a possible and more expensive interpretation of the items in question.

Remedial Suggestions

Now what do we learn or how can we benefit from the above analysis of this subject? Is there any way by which some of the work of estimating may be eliminated? We can say, yes, to this, but we are not so certain when asked if any of the cost can be cut out.

If the mill work lists were made in the architects' offices and sent out with the plans for blanket bids. the mill would have to verify the list and that would save little if any time. If the list was considered correct and only the details were sent along to enable the mill man to price the articles listed, the responsibility as well as the work would be thrown back on the architect's office, and the only possible question of saving would lie between the architect's charge for this service and risk, and the listing of the material by half a dozen more or less of mill-work estimators.

If the average cost of estimating mill work amounts to 5 per cent. of the business secured in that way, it arises from the fact that the mills figure on four or more plans to every contract they land.

As far as the contractor is concerned, it is practically useless to expect him to make lists of mill work, and if they all did it, there would be about as much work involved as now, and we are forced back upon the alternative of the mill and the architect. Perhaps some ambitious as well as able architect will set the good example of furnishing complete and guaranteed lists of mill work with his plans, and others thereby forced to do likewise! However, if he ever does put out a list of mill work we will see this note in some conspicuous place on the printed heads: "Any discrepancy occurring between this list and the plans and specifications covering the same, must be reported to the architect for correction before proceeding with the work!" And would a list like that be a help to any party concerned?

Perhaps more can be done in the mill office to cut down the cost of estimating than at any other point, if the architect will but do his part in making his plans, specifications and details of such a character as may be read and interpreted without doubt and delay.

Sliding Fireproof Doors for Dry Kilns

A subscriber recently wrote the Canadian Woodworker as follows: "We expect to put new doors on our dry kilns at an early date. We want them to be sliding, and fireproof. Is there a good door of this kind manufactured in Canada?"

The enquiry was referred to several parties. Messrs. Sheldons, Limited, of Galt, Ont., wrote us as follows:

"Regarding your enquiry whether we know of a good sliding fireproof door for lumber dry kilns, we regret to say that we do not believe there is such a thing in use in the present day."

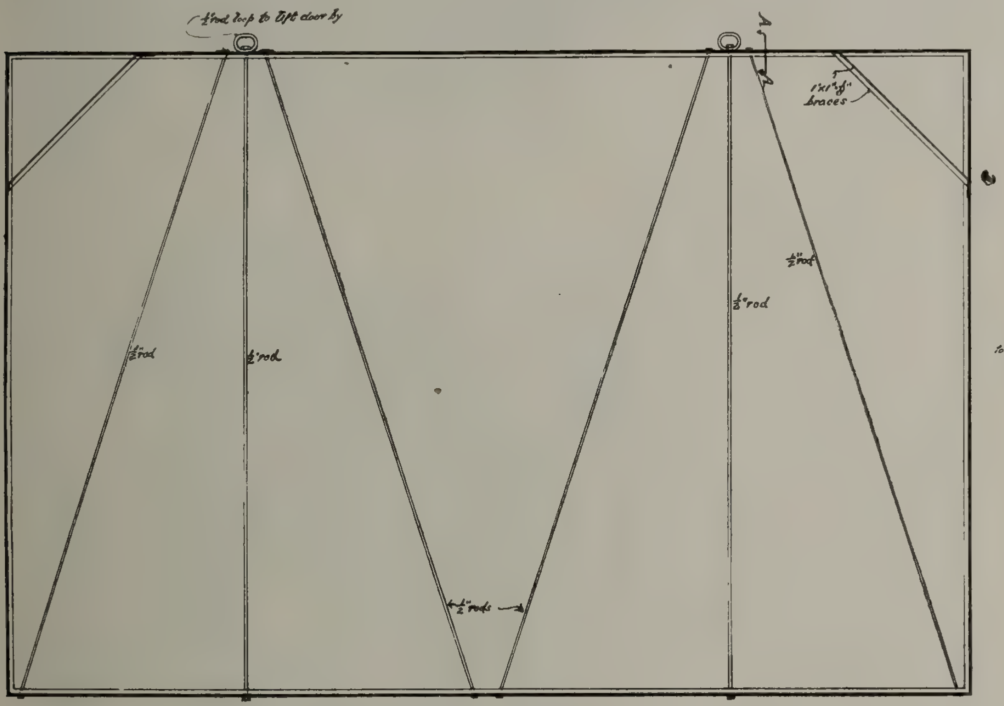
"Under the present conditions of lumber drying, using considerable free steam among the lumber to soften and prepare it, there is a large amount of acid vapor driven out, particularly when drying oak. This acid vapor attacks anything in the shape of metal, and to protect the trucks, rails, piping, headers, etc., it is necessary to coat them with paint that is both steam and acid proof. As the equipment in the kiln is heavy, a slight coating of rust does no harm. When it comes to the doors, however, the ordinary method of covering the door with iron to make it fireproof does not serve the purpose, as the tin or thin iron very soon eats through.

"You may suppose that this sheet metal could also be painted, but the trouble is that a sliding door always rubs more or less and the paint would be scoured off, leaving a raw surface exposed to the action of the acid.

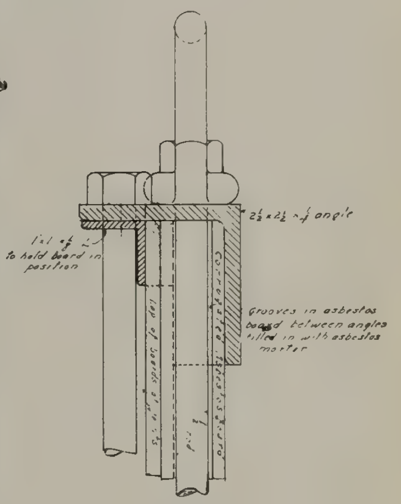
"The only thing we have seen so far that would fill the bill is the asbestos sheeting made by one of the asbestos companies. This material is made in sheets exactly the same as galvanized iron and is furnished in the flat and corrugated. It seems to us that a material of this kind could be attached to a steel or wooden frame, the frame work on the outside, and it would be fireproof, acid proof, moisture proof, and a most desirable door in every respect.

"We have investigated it to a cretain extent, and have gone so far as to make a drawing showing this door, but we fancy the cost will be pretty high. We are enclosing a couple of blue prints of this drawing, which may lead to something suitable. It was the intention when getting out this drawing to handle the door with an apparatus similar to the door carrier made by the Indianapolis Door Carrier Company, of Indianapolis."

The Canadian Woodworker invites a discussion of this subject, which is doubtless of interest to all owners and operators of dry kilns.



Elevation of Door



Detail AA

Sectional plan

That British Columbia manufactured lumber is successfully meeting competition with United States lumber is shown by a contract for 100,000 doors recently given to the Walsh Sash and Door Factory. The order was placed by the British American Company, of Vancouver, which is the Canadian agency of the Chicago Lumber and Coal Company, of St. Louis. This company has previously placed its orders for doors with Washington factories. Prospects in the sash and door business are excellent, in view of the fact that Vancouver now imports fifty per cent. of her sashes and doors from the United States in the face of a 25 per cent. duty, and local factories expect to be able to handle this United States trade by expanding their factories to meet the strong demand. Thus the Walsh Sash and Door Factory is now making arrangements to build additional dry kilns and increase its force of employees from 55 to 75 or more.

"Mission Furniture, and How to Make It," is the title of a booklet issued in three parts by the Popular Mechanics' Book Department of Chicago, Ill. It gives full and comprehensive details for the making of this class of furniture, from how the lumber should be cut and fitted, to the treatment for polishing and finishing, and the instructions are given in such simple and plain language that anyone can understand them. Particulars are also given for the construction of burlap and leather covered and brass topped furniture; in fact, the designs given cover nearly

everything in furniture that is useful or ornamental. The text and illustrations have been prepared especially by experts and are up-to-date in every respect. The price of each of the three parts is fifty cents.

There will be no change in management, the previous owners being retained as operating managers, thus insuring a continuance along the same successful lines as heretofore.

The Nash Twelve Spindle Power Feed Universal Boring Machine

This machine is designed for a particular class of work, namely, the boring of spindle and post holes in chair seats and spindle holes in chair backs. Its usefulness, however, does not stop here. It will do a great variety of other boring, using any number of spindles from one to twelve.

The universal adjustment of the boring spindles is complete, admitting of the spindles being set at any angle up to 35 degrees. Each spindle can be set at a different angle, the spindles being independent of each other in their adjustment, and can be set to bore holes as close as 1 inch, center to center, and up to 24 inches apart. A transverse adjustment of 4 inches can be had. When these boring spindles are put in position, they can be firmly locked by the turning of one screw, thus reducing to a minimum the time required to make changes. There is also a vertical adjustment of 2½ inches, which admits of boring holes of unequal depths. Holes can be bored on a straight line, on a circle, zigzag, or in any position required. All adjustments can be made very quickly.

The universal points are carefully constructed out of the best tool steel, and hardened; their construction is such that they are strong and durable and run steadily with no vibration. They will stand a great amount of end thrust and are particularly well adapted for the work required of them in this machine.

The vise is a very complete arrangement for holding the work. The inner jaws of the vise are of wood and can be made any radius or shape desired. The vise is easy to operate, and the grip on the work is such that the work is readily brought to the shape of the jaws. The ease with which work can be handled with this device in connection with the power feed and quick return of the boring bits makes it possible for an active operator to bore a large amount of work in an hour, and to bore it all uniformly and accurately, one piece being just like another. The twelve holes can be bored in the same time that it requires to bore one. Angle of table can also be had which is a convenience in boring some kinds of work. The table is raised and lowered by a hand wheel and screw.

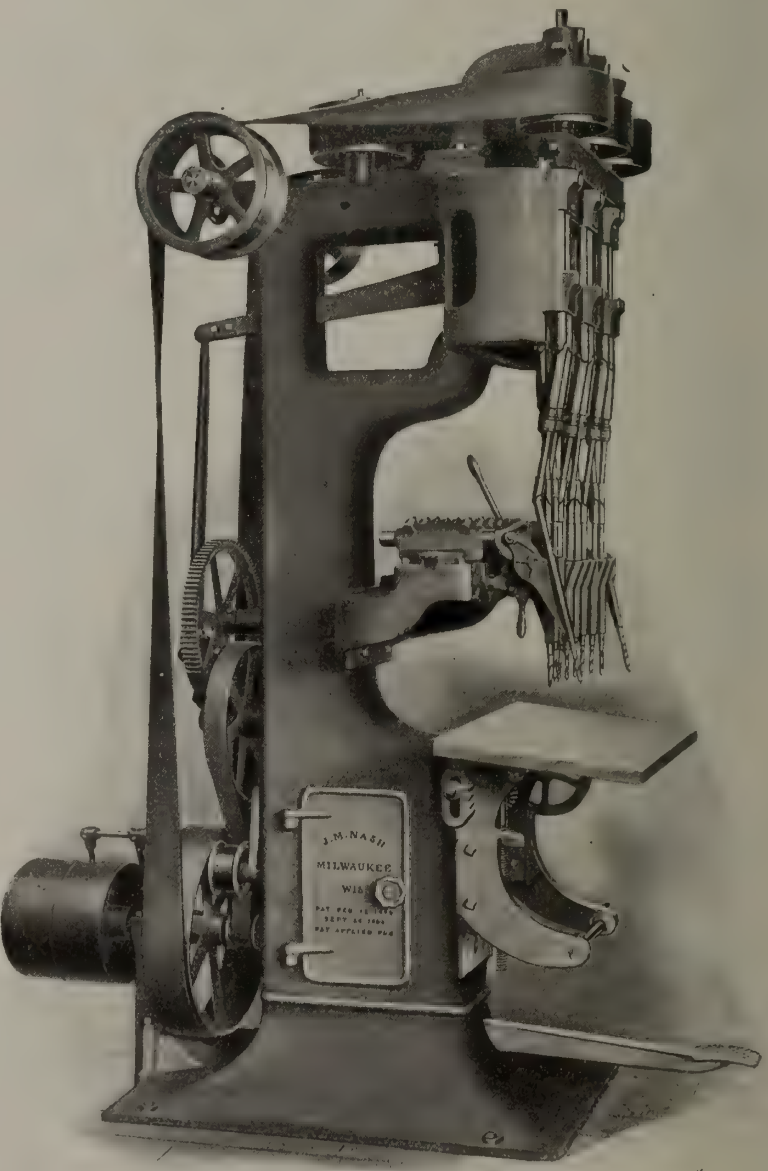
The belt to drive the boring spindles can be made endless. A conveniently arranged tightener, with screw and handwheel, gives the proper tension to the belt at all times. The power feed makes the machine wonderfully easy to operate, easier for the operator than a single bit boring machine. The boring spindles have a quick return, which admits of very rapid work. A recent improvement is the continuous feed with three changes of speed. Thus the machine can be run to keep the fastest operator busy.

The machine is made very strong and substantial throughout. Only the most reliable and experienced help is employed and the best quality of material used. Every machine is belted up and thoroughly tested before leaving the shop. The machine has a capacity of from 1,000 to 1,200 pieces an hour. The floor space required for the machine is 3½ x 6 feet and weight is 2,500 pounds.

Mr. Nash builds two other boring machines—an eight spindle machine for work similar to that done by the twelve spindle, and a four spindle machine for boring the four leg holes in the bottom of the chair seat at one operation.

The Walsh Sash & Door Company, Limited, New Westminster, has applied to the city for use of a strip of land required in order to increase their dry-kiln capacity. A contract for the construction of 100,000 doors before the close of 1913, placed by the British American Lumber Company, Limited, Vancouver, will make it necessary to operate the plant night and day, hence the need of more dry kiln accommodation. The working force will be increased from 55 to 75 hands, and the pay roll from $1,000 to $1,800 a week.

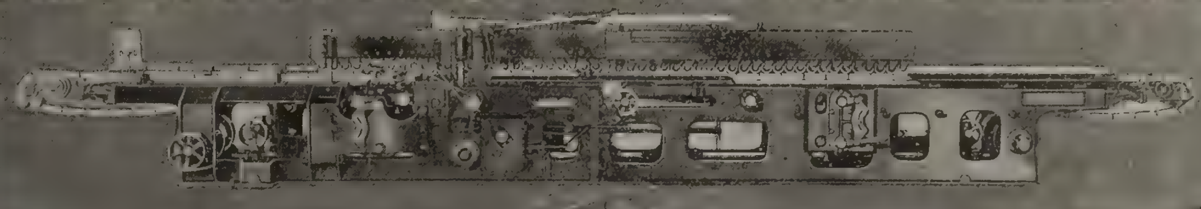
J. & W. Duncan Company, Limited, 1833 Ontario street, Montreal, Que., are having plans drawn for a planing mill to cost $5,000. The building will be of two storey construction, 40 x 80 feet, with cement foundation. The firm will be in the market for machinery.



The Nash Universal Boring Machine

LINDERMAN

AUTOMATIC DOVETAIL GLUE JOINTER



Found $5300.00

waste in cutting up, jointing and glueing departments

A General Manager and the Superintendent of a prominent Canadian Furniture Concern last April figured that they were losing $5300.00 that could be saved should they install a Linderman Dovetailer, and at the April meeting of their Board of Directors submitted figures showing where the loss occurred.

In December, after having the machine in operation over six months, the General Manager brought out the same estimate sheet that was submitted to the Board of Directors six months previous and proved from his cost figures that his estimate had been correct.

In the six months just ended their figures showed that they had consumed:—

3500 lbs. of glue less than during the previous six months.

Five men had been taken from the ripping, jointing and glueing departments and sent into other parts of the factory.

Over 50,000 feet of lumber had been saved.

These figures were given to us voluntarily as an actual fact, and the General Manager then stated "We expect next year to build a factory to double our output, when we will install a second machine."

One week previous to this conversation, the General Manager of another furniture factory, who had had a Linderman machine in operation since August stated that his cost figures showed he was making a saving of at least $10.00 each working day; that they would save at least 75,000 feet of lumber a year; the labor of three men, and fully sixty per cent. of their glue bills.

Besides the actual money saving there is a further saving which cannot be estimated in dollars and cents. What would be your output loss if you had to sand every piece by hand instead of by machinery? What is your gain in output by being able to glue up practically every piece by machinery instead of by hand, and to know that at the end of each day's run practically all the stock that has been cut up has been glued and is ready to move on the next morning through the machine departments?

May we not be permitted to investigate your conditions and tell you approximately what we can save for you?

Canadian Linderman Co., Ltd.

—— Works at ——

Muskegon, Mich. Woodstock, Ont.

A Machine that Effects Economy in the Planing Mill

The first machine for cutting pockets in window frames was introduced by the Smith & Phillips Manufacturing Company over twenty years ago. At that time one hundred per cent. of the frames were made by hand and fully seventy-five per cent. were made by the carpenter and not by the mill. Crude as the first pocket machine was, it demonstrated that the making of window frames was the mill's business and not the carpenter's, from the fact that the part requiring the most labor (the pocket) could be done in but a moment by a machine.

The Smith & Phillips machine does everything shown above.

Their next introduction was the Combined Pocket Cutting and Pulley Mortising Machine, Dado and Saw Table, and today there are few well equipped mills without this commonly known "Perfect Window Frame Machine No. 3." This machine complete requires a floor space of only 3 ft. 4 in. by 4 ft. 8 in. Its weight is 1,100 lbs. and it is easy to operate. All the work is done on the one machine, saving time and labor, thereby reducing cost of frame-making to a minimum.

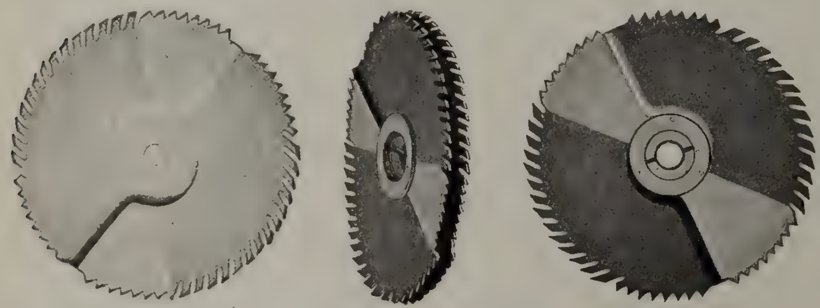
As a result a new and profitable branch of mill work was introduced and the Smith & Phillips Manufacturing Company have many testimonials as to the profit this machine affords the mill.

Further information and literature describing this tool will be sent upon application to Smith & Phillips Manufacturing Company, 412 N. Sangamon Street, Chicago, Ill. THE "Lamson" Cutter Heads for Grooving and Dadoing..

The "Lamson" Cutter Heads for Grooving and Dadoing

The illustrations of the "Lamson" Cutter Heads reproduced herewith, show both their single and adjustable cutter heads. The single head for the individual cuts is made in diameters from 7-in. to 14-in., and in cuts as small as 3/16-in. and up to 7/8-in., only in heads 7-in. to 10-in. diameter; also single cuts from 5/16-in. to 1-in. inclusive in the 12-in. and 14-in. diameters.

The adjustable head is composed of two blades and is adjusted by a screw in the hub, which is operated by a small fork-wrench or key, and can be set to any size required from given sizes. Each blade is a single piece. The finer outside teeth act as spurs, the larger teeth being cleaners. The head crosses the cut twice in each revolution, leaving it perfectly smooth at sides and bottom. The manufacturers claim that this device will make the same width of groove until entirely worn down to the hub or collar.



Lamson Cutter Heads

They claim to have over 25,000 of their cutter heads for grooving and dadoing now in use all over the world. Every head is accurately jointed and filed before being sent out, thus ensuring a perfect and accurate cut. The manufacturers claim that they are unequalled as economizers of time, power and expense.

The Lamson Cutter Head Company, of 30-34 N. Jefferson Street, Chicago, Ill., make any special size of head with any number of grooves, to order.

The News—From Coast to Coast

W. R. Stephenson, Appin, Ont., is advertising his planing mill business for sale.

The Notre Dame Furniture Company, wholesale and retail, Montreal, P.Q., has been registered.

The new plant of the Duhamel Willow Furniture Company is now in operation at St. Hyacinthe, Que.

The D. R. McIntyre Furniture Company, manufacturers, of Tillsonburg, Ont., are removing to Alliston, Ont.

P. Burgess has purchased the woodworking business at Eburne, B.C., formerly owned by L. H. Richards.

Mr. Jno. McGuirl, well known in western furniture-making circles, died at Moosomin, Sask., recently.

The House Furnishing Company, Limited, Toronto, is a newly incorporated concern capitalized at $40,000.

F. M. Steadman & Company, sash and door manufacturers, Digby, N.S., have dissolved their partnership.

The Beverley Wood Specialty Company have removed to more commodious premises at 91 Niagara street, Toronto.

Carreau & Quintin, sash and door manufacturers, Marieville, Que., are reported to have dissolved their partnership.

The Brunette Sawmills Company, Limited, New Westminster, will expend $15,000 this season for new machinery and additions to the plant.

J. B. Lebarge & Sons, Sudbury, Ont., are preparing plans for the erection of a sash and door factory. They are in the market for general machinery.

The Boyd sawmill at Cowichan Bay, Vancouver Island, operated some years ago by the International Lumber Company, and later by Tackett & O'Neil, has been taken over by R. J. Elliott, until recently assistant manager of the Victoria Lumber & Manufacturing Company, Chemainus.

The Toronto Furniture Company, Limited, recently gave an enjoyable banquet to some sixty executive heads of the local local furniture industry. A tour of inspection was made through the factory and the different processes of manufacture were explained by Messrs. Ridout & Dixon. The guests included Mr. C. A. Coryell, president of the Adams Furniture Company, Limited; Mr. Clarence Coryell, of Bedells Furniture Company, Limited; Mr. Robt. Kilgour, of the Imperial Rattan Company, Limited, Stratford; Mr. Scott, of the T. Eaton Company, Limited, and Mr. Bradshaw, of Murray-Kay, Limited. The speeches at the banquet were interspersed with musical items.

Hillsborough, N.B., will be the headquarters of the Albert Lumber Company, Limited, which has just obtained a charter with a capital of $60,000.

The Nadeau Lumber Company, Limited, was recently incorporated with a capital of $25,000 to manufacture and deal in lumber, sashes, doors, furniture and other articles of wood. The head office is to be at Montreal. The incorporators are

N. Nadeau, E. E. Howard, J. De Witt and W. H. Howard, all of Montreal.

Mr. T. O. Warden is conducting the furniture business at Vegreville, Alta, formerly owned by Messrs. Clute & Walker.

The Uxbridge factory of the Gold Medal Manufacturing Company is now in full swing, with some forty hands engaged.

A small factory for the manufacture of revolving show cases has been started at Smith's Falls, Ont., by Mr. G. H. Hammond.

A new woodworking concern has lately been incorporated in Winnipeg, under the name of The Winnipeg Woodworkers Company.

The Stratford Brass Company is a new industry at Stratford, Ont., which will manufacture all kinds of brass trimmings for furniture.

J. M. Bateson, a woodworker in Winnipeg, recently suffered total loss by fire. His business was only partially covered by insurance.

The Ball Planing Mill Company, Limited, Barrie, Ont., have received the contract for supplying the interior trimmings at the Newmarket High School.

The Knight Manufacturing & Lumber Company, Limited, Meaford, Ont., manufacturers of interior fittings, are working full time and have many orders ahead.

A small sawmill is to be erected in the early spring at the junction of the Little Salmon and Fraser Rivers. George Smith, of Vancouver, is behind the enterprise.

Mr. W. K. Dryden, of the township of North Dumfries, Ont., a well-known sawmiller in that district, died recently. He is survived by a widow and eleven children.

Tickell & Sons' large furniture factory at Belleville, Ont., was damaged by fire a few days ago. The origin of the fire is supposed to have been in the shavings depository.

Christie & Company, of Vancouver, have leased the shingle mill at Nanoose Bay, Vancouver Island, and will operate it to full capacity during the coming season.

Fire recently destroyed the sawmill belonging to Alphonse Lapierre, St. Sabastien De Beauce, Que. The loss amounted to more than $6,000 and the insurance was only $1,200.

The flood caused by the sudden rising of the Grand River recently, damaged to some extent the factories of J. G. Mundell & Company, and the Elora Furniture Company, Elora, Ont.

Capt. Justice, of Salt Springs Island, has let a contract for a small sawmill to be driven by an oil engine using 35 gravity fuel. The capacity of the mill will be about 6,000 feet per day.

The Smith Furniture Company, Limited, enters the manufacturing field at London, Ont., with a capital of $40,000. H. T. Smith and J. W. Godfrey are among the provisional directors named.

The Canadian Pacific Lumber Company's mill at Port Alberni, Vancouver Island, resumed operations February 10th, after a shut-down to permit of the placing of a new resaw and other machinery.

The Quatsino Timber Company, Limited, recently incorporated with $75,000 capital, contemplates the erection of saw and planing mills during the coming season. Victoria citizens compose the company.

The McNair-Fraser Lumber Company's sawmill at Hollyburn, West Vancouver, completed in February, 1912, and operated steadily all season, has undergone a change in ownership. The new firm—the Hollyburn Lumber Company, Limited—is adding a shingle department which will have two machines, while a new A. R. Williams Company planer will turn out finish lumber. The plant has a capacity of about 30,000 feet daily.

Napoleon Labrie, St. Charles, Que., is erecting a sawmill. He is in the market for a planer and other sawmill machinery. Second-hand machinery would be suitable. He also requires steam plant and water wheels.

Wilson Bros., Collingwood, Ont., manufacturers of doors, flooring and interior fittings, report that last year they did more business than at any time previously, and prospects are bright for even a better year in 1913.

Messrs. Reitzel Bros., Waterloo, Ont., expect to commence the erection of a planing mill on the site of the old Bechtel brickyard, Allen street, within the next few weeks. They purpose erecting a one-storey cement building.

The Upper Fraser River Lumber Company have started operations on the erection of a large sawmill at Don Creek, Alta. The president of the company is Hon. W. C. Edwards, Montreal. The secretary is Mr. G. B. Pyke, also of Montreal.

Consumers' Box and Lumber Company, Limited, has been incorporated with a capital of $500,000, to manufacture and deal in lumber, woodenware, logs, timber, shingles and all kinds of builders' supplies, with head office at Toronto.

Damage to the extent of $70,000 was caused by fire which broke out in the Chamberlan avenue woodworking plant of the McAuliffe Lumber Company, Ottawa, Ont., a few days ago. The building was completely gutted and the flames destroyed much valuable machinery.

One of the two sawmills which Messrs. Lander, Spears & Howland are erecting in the township of Blair, Ont., is now cutting, and the other is expected to be ready in a few weeks. The machinery for these mills was supplied by the E. Long Manufacturing Company, Limited, Orillia, Ont.

At Toronto, recently, there occurred the death of Mr. George Hastings, formerly connected with the Hastings & Peterkin Planing Mills. Mr. Hastings, who retired from active business some twenty-five years ago, came to Toronto from Ireland sixty years ago, when the trip took six weeks.

The Kingsdale Planing Mill and Lumber Company, Limited, has been incorporated with a capital of $100,000 to manufacture all kinds of lumber, timber and wood substitutes with head office at Toronto. The provisional directors are C. F. Wright, J. G. Wright, Jas. Barr and R. C. Nelles, all of Toronto.

Mr. J. H. McDonald, of Amherst Pianos, Limited, recently stated that owing to the rapidly increasing population of Canada and the lessened popularity of the melodion and organ, the demand for pianos had become so great that it was almost impossible for the manufacturers to keep pace with the requirements.

Connors Bros., Limited, Black's Harbor, N.B., are considering the erection of a mill at that place. Their intention is to erect a plant operated by a 100 h.p. steam unit, with rotary planer, box making, shingle and woodworking machinery. The firm will be in the market for equipment of this class and also for engines, mill equipment, belting, boilers, etc.

The planing mill industry in Saskatchewan shows a large general increase. Planing mills were opened last year at Weyburn, Rosthern, Regina, Saskatoon, North Battleford, and Humboldt among other points. The wood-working industry is one which has rapidly been forging to the front until the home products will within the near future be sufficient to supply the great demand for this line of material, such as sashes and doors, furnishings, etc. In the year 1911

four wood-working establishments were added to the list of factories in the province as compared with an increase of twelve during 1912.

The National Saw Company, Limited, was recently incorporated at Ottawa, with a capital of $500,000, to manufacture and deal in all kinds of saws, etc., and to take over as a going concern the A. J. Burton Saw Company, of Vancouver and Ottawa. Hon. N. A. Belcourt and some of the leading manufacturers and business men of Ottawa are interested in the new company.

The Reliance Sash & Door Factory, Vancouver, recently installed a No. 404 S. A. Woods fast feed planer and matcher; the Canadian Western Lumber, Limited, Fraser Mills, No. 107 S. A. Woods moulder, No. 404 fast feed planer and matcher, together with automatic knife and sidehead grinders; while another No. 404 machine has been ordered by the Pacific Box Company for their new factory.

Hon. Adam Beck, who is the owner of several large areas of white wood, is experimenting with this material with a view to its use in box factories. It is reported that Mr. Beck is considering building a sawmill and kilns at Iroquois Falls, where the wood can be cut and dried, thus saving a considerable amount in freight. The Quincy Adams Company, of Toronto, are also reported to be entering the market for white wood.

Graves Bigwood & Company, Toronto, have decided to erect a modern and thoroughly up-to-date mill at Byng Inlet, Ont., to take the place of the one which was destroyed by fire last year. The foundations for the new mill are already in and contracts for the erection will be let immediately. The plant will have a capacity of about 175,000 feet per day, and will be equipped with modern machinery and all the latest labor-saving appliances.

Messrs. Chappell Bros. & Company, Limited, lumbermen, manufacturers and contractors, Sydney, N.S., will build a small stationary saw and lath mill at Grand Mira North in Cape Breton, N.S. The addition of this plant will give the firm two sawmills and two woodworking plants in Cape Breton, N.S., and necessitates the erection of larger and more commodious general offices at their headquarters on Brookland street, Sydney. Mr. R. R. Chappell is president and general manager.

Local interest at Port Haney, B.C., is centered on a wood-chopping match for $100 side bet which has been arranged to take place shortly between Thos. Haney and James Best, both of Port Haney. One cut will be made in a log not less than 15 inches in diameter, both men to cut on the same stick, though at different places. The competitor making the fastest time will be awarded the stakes. Mr. Haney is 72 years of age, and Mr. Best somewhat younger.

The Dominion Mahogany and Veneer Company, Montreal, Que., report business very satisfactory for the first three months' active operation. A good demand has been found for veneers made in Canada and the company has a large volume of orders on hand. They are manufacturing at the present time all kinds of the best classes of Canadian wood veneers in addition to mahogany and other woods imported from abroad in the log. This company is capitalized at $250,000. It was organized in the fall of last year by Senator Curry, who is the president of the company.

Dominion Manufacturers, Limited, is the name under which the business of seven of the principal Canadian casket manufacturing concerns will hereafter be directed, the new corporation being a holding company controlling the following:—Winnipeg Casket Company, Winnipeg; Globe Casket Company, London, Ont.; Semens & Evel, Hamilton; National Casket Company, Toronto; Elliott & Son, Prescott, Ont.; Girard & Godin, Three Rivers, Que.; Christie Bros., Amherst, N.S. The company is capitalized at $1,000,000 preferred stock, $2,000,000 common stock, with an issue of $550,000 bonds. The constituent companies have received preferred and common shares of the new company in payment of their individual businesses.

WOODWORKING MACHINERY

More than 1,000 Second-hand Machines, Renewed and Guaranteed.

52 Lines of New Machinery the Largest Stock in the World.

Section of main floor Exhibit and Salesrooms

CHICAGO MACHINERY EXCHANGE, Inc., 1219-1227 Washington Bv'd. CHICAGO, Ill., U. S. A.

Dustman's Book of Plans and Building Construction

By U. M. Dustman, (Licensed Architect)

250 Pages, size 9 x 13, bound in blue cloth. Price $2.00.

This book contains plans, with estimated cost, of one hundred and fifty houses, bungalows and barns, in frame, concrete or brick construction. It also deals with general construction plans, arrangement of rooms, figuring amount of material required, details of interior construction and finish, window and door framing, stairways, store fronts, roof construction, itemized lists of material, costs, etc.

The American Lumberman says of this book :—"It is more complete and up-to-date than any other book along the same lines."

The St. Louis Lumberman says :—"The most pretentious book of plans and building construction that has ever come to our attention."

Send your orders to

Woodworker Publishing Company, Limited

Nicholls Building, Toronto

Should be Investigated

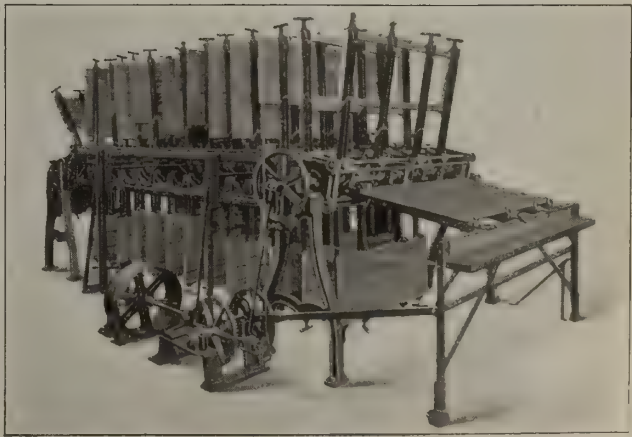
The advantages, conveniences and good points of this machine should be investigated by modern wood-working establishments.

The Billstrom Automatic Glue Clamp Carrier

modernizes the glue department thoroughly. The many dollars lost in the average glue room will help pay for this machine. One user said he would not be without it for many times its cost. Facts with complete particulars and description will help your investigation.

We have over 170 machines in operation.

Nels J. Billstrom, 1315 Tenth St., Rockford, Ill.



BUYER'S DIRECTORY

AUTOMATIC DOVETAIL GLUE JOINTER
Canadian Linderman Machine Co., Ltd., Woodstock, Ont.

AUTOMATIC GLUE CLAMP CARRIER
Nels J. Billstrom, 1315 Tenth street, Rockford, Ill.

BABBITT METALS
Shurly Dietrich Co., Ltd., Galt, Ont.
Fay & Egan Co., Cincinnati, O.
Canada Metal Co., Ltd., Toronto.

BALUSTER LATHES
C. Mattison Machine Works, Beliot, Wis.
Thos. White & Sons, Paisley, Scotland.
Chicago Machinery Exchange, Chicago, Ill.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.
Canada Machinery Corp., Ltd., Galt, Ont.

BAND SAW FILING MACHINERY
Shurly Dietrich Co., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

BAND SAWS
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Shurly Dietrich Co., Ltd., Galt, Ont.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
R. H. Smith Co., Ltd., St. Catharines, Ont.

BAND SAW MACHINERY
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
H. W. Petrie, Ltd., Toronto.

BAND SAW MILLS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., Cincinnati, Ohio.

BAND SAW STRETCHERS
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

BENDING MACHINES
Fay & Egan Co., Cincinnati, Ohio.

BELTING
J. A. Fay & Egan Co., Cincinnati, Ohio.
Sadler & Haworth, Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
H. W. Petrie, Ltd., Toronto.

BELTS (Endless)
Candada Machinery Agency, Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Sadler & Haworth, Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
H. W. Petrie, Ltd., Toronto.

BELT CEMENT
Sadler & Haworth, Montreal.

BELT FASTENERS
Sadler & Haworth, Montreal.

BELT DRESSING
Sadler & Haworth, Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

BLOWERS
Sheldons Limited, Galt, Ont.
H. W. Petrie, Ltd., Toronto.

BLOW PIPING
Sheldons Limited, Galt, Ont.

BOILERS
Canada Machinery Agency, Montreal.
H. W. Petrie, Limited. Toronto.

BORING MACHINES
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Mussens, Limited, Montreal.
J. M. Nash, Milwaukee, Wis.
Valley City Machine Works, Grand Rapids. Mich.
H. W. Petrie, Limited, Toronto.

BOX MAKERS' MACHINERY
Canadian Linderman Co., Ltd.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.

BROKEN CASTINGS BRAZED—MACHINIST AND DIE MAKER
W. H. Dunne, 1492 Queen St. West, Toronto.

CABINET PLANERS
Canada Machinery Corporation, Ltd., Galt, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Agency, Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Valley City Machine Works, Grand Rapids, Mich.
Baxter D. Whitney & Son, Wichendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Ltd., Toronto.

CARS (transfer)
Sheldons Limited, Galt, Ont.

CARVING MACHINES
Canada Machinery Corporation, Ltd., Galt, Ont.
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Hespeler Machinery Co., Ltd., Hespeler, Ont.
Valley City Machine Works, Grand Rapids, Mich.

CHISELS
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

CIRCULAR SAW MILLS
Canada Machinery Agency, Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
H. W. Petrie, Limited, Toronto

CHAINS (Silent)
Jones & Glassco, Montreal

CLAMPS (Chain, Carpenter, Cabinet, Pattern Makers, Bench, Mitre, Piling, Mounted and Rotary Wheel)
Black Bros. Machinery Co., Mindota, Ill.
J. A. Fay & Egan Co., Cincinnati, Ont.

CLAMPS (Saw)
Shurly Dietrich Co., Ltd., Galt, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

CLUTCHES
J. A. Fay & Egan Co., Cincinnati, Ohio.

COLUMN CLAMPS
Black Bros. Machinery Co., Mendota, Ill.

COLUMN MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.

CORE BOX MACHINES
J. A. Fay & Egan Co., Cincinnati, Ohio.
Chicago Machinery Exchange, Chicago, Ill.
E. & B. Holmes Machinery Co., Buffalo, N.Y.

CUT-OFF SAWS
Canada Machinery Corporation Ltd., Galt, Ont.
Shurly Dietrich Co., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Berlin Machine Works, Ltd., Hamilton, Ont.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

CUTTER HEADS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Lamson Cutter Head Company.
Samuel J. Shimer & Sons, Milton, Pa.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

DADO HEADS
C. Mattison Machine Works, Beloit, Wis.
W. A. Elliott, Bathurst and College Sts., Toronto.

DIEMAKERS & MACHINISTS
W. H. Dunne, 1492 Queen St. West, Toronto.

DISK GRINDERS
J. A. Fay & Egan Co., Cincinnati, Ohio.

DOGS (Saw Mill)
J. A. Fay & Egan Co., Cincinnati, Ohio.

DOVETAILING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canadian Linderman Machine Co., Ltd., Woodstock, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

DOWEL MACHINES
Thos. White & Sons, Paisley, Scotland.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Dauber-Bell Machine Company.
J .A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Valley City Machine Works, Grand Rapids, Mich.

DRYING MACHINERY
Sheldons Limited, Galt, Ont.
Morton Dry Kiln Co., Chicago, Ill.

DRY KILNS
Sheldons Limited, Galt, Ont.
Morton Dry Kiln Company, Chicago, Ill.

DUST COLLECTORS
Sheldons Limited, Galt, Ont.

DUST SEPARATORS
Sheldons, Limited, Galt, Ont.

EDGERS (Gang)
Berlin Machinery Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

EDGERS (Single Saw)
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Agency, Montreal.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

END MATCHING MACHINE
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

ENGINES (Steam)
H. W. Petrie, Limited, Toronto.

EXHAUST FANS
Sheldons, Limited, Galt, Ont.

FLOORING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corporation, Ltd., Galt, Ont.
Baxter D. Whitney & Son, Winchendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

FLINT
Wausau Quartz Co., Wausau.

FLUTING HEADS
J. A. Fay & Egan Co., Cincinnati, Ohio.

GAINING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Canada Machinery Corporation, Ltd., Galt, Ont.
H. W. Petrie, Limited, Toronto.

GAS ENGINES
H. W. Petrie, Limited, Toronto.

GAUGES (Saw)
Shurly Dietrich Co., Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

GLUE CLAMPS
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.

GLUE HEATERS
J. A. Fay & Egan Co., Cincinnati, Ohio.

GLUE JOINTERS
Canada Machinery Corporation, Ltd., Galt, Ont.
Canadian Linderman Company, Limited, Woodstock, Ont.
Chicago Machinery Exchange, Chicago, Ill.

GLUE SPREADERS
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

GRINDERS (Cutter)
J. A. Fay & Egan Co., Cincinnati, Ohio.

GRINDERS (Knife, etc.)
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

GRINDERS (Tool)
J. A. Fay & Egan Co., Cincinnati, Ohio.
Valley City Machine Works, Grand Rapids, Mich.

GROOVING HEADS
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Samuel J. Shimer & Sons, Milton, Pa.
Canada Machinery Corporation, Ltd., Galt, Ont.

HAND PROTECTORS
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Jones Safety Device Co., Hamilton, Ont.

HAND SCREWS
Black Bros. Machinery Co., Mendota, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

HEATING APPARATUS
Sheldons, Limited, Galt, Ont.

HANDLE AND SPOKE MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
J. M. Nash, Milwaukee, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.

HUB MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

HYDRAULIC VENEER PRESSES
Wm. R. Perrin & Co., Ltd., Toronto.

INJECTORS
H. W. Petrie, Limited, Toronto.

JOINTERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canadian Linderman Co., Ltd., Woodstock, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Plessisville Foundry, Plessisville, Que.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

KNIVES (Planers and Others)
Shurly Dietrich Co., Ltd., Galt, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Samuel J. Shimer & Sons, Milton, Pa.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
H. W. Petrie, Limited, Toronto.

LACE LEATHER
Sadler & Haworth, Montreal.

LATHES (Pattern Makers')
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Valley City Machine Works, Grand Rapids, Mich.
H. W. Petrie, Limited, Toronto.
Thos. White & Sons, Paisley, Scotland.

LATHES (Turning)
Berlin Machine Works, Lid., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Valley City Machine Works, Grand Rapids, Mich.
Baxter D. Whitney & Son, Winchendon, Mass.
H. W. Petrie, Limited, Toronto.

LOOSE PULLEYS
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corporation, Ltd., Galt, Ont.

LUBRICANTS AND GREASES
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.

LUMBER
Anderson Lumber Company, C. G. Elgie & Jarvis, Toronto.

MITRE MACHINES
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N. Y.
H. W. Petrie, Limited, Toronto.

MITRE SAWS
Shurly Dietrich Co., Ltd., Galt, Ont.
E. C. Atkins & Co., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corporation, Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

MITRE CLAMPS
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.

MORTISING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Jones & Glassco, Montreal.
Valley City Machine Works, Grand Rapids, Mich.
H. W. Petrie, Limited, Toronto.

MOTORS
J. A. Fay & Egan Co., Cincinnati, Ohio.

MULTIPLE BOXING MACHINES
J. A. Fay & Egan Co., Cincinnati, Ohio.
J. M. Nash, Milwaukee, Wis.

PATTERN SHOP MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

PICTURE FRAME MACHINERY
Black Bros. Machinery Co., Mendota, Ill.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.

PLANES
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corp., Ltd., Galt, Ont.

PLANERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

PLANING MILL MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Chicago Machinery Exchange, Chicago, Ill.
C. Mattison Machine Works, Beloit, Wis.
Samuel J. Shimer & Sons, Milton, Pa.
Baxter D. Whitney & Son, Winchendon, Mass.
Black Bros. Machinery Co., Mendota, Ill.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie Co., Ltd., Toronto.

PULLEYS
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

RESAWS
Shurly Dietrich Co., Ltd., Galt, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

RESAWS
H. W. Petrie, Limited, Toronto.

RIM AND FELLOE MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corp., Ltd., Galt, Ont.

RIP SAWING MACHINES
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Canada Machinery Corp., Ltd.. Galt, Ont.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

SAFETY GUARDS (For Band Saw Machines, Jointers, Rip Sawing Machines, Shapers, Swing Saws, etc.)
Chicago Machinery Exchange, Chicago, Ill.
Fair Manufacturing Company, Racine, Wis.
Jones Safety Device Co., Hamilton, Ont.

SANDERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
J. M. Nash, Milwaukee, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Fisher Sander Co., Berlin, Ont.
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.
Elliot Woodworker Co., Toronto.

SANDPAPER
Black Bros. Machinery Co., Mendota, Ill.

SANDERS (Moulding, Belt and Panel)
Black Bros. Machinery Co., Mendota, Ill.
Chicago Machinery Exchange, Chicago, Ill.
H. W. Petrie, Ltd., Toronto.

SASH, DOOR INTERIOR TRIM AND COLUMNS
M. Brennan & Sons, Hamilton, Ont.

SASH, DOOR AND BLIND MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Samuel J. Shimer & Sons, Milton, Pa.
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.

SAWS (Hand)
Shurly Dietrich Co., Ltd., Galt, Ont.
E. C. Atkins & Co., Hamilton, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

SAW MILL MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
H. W. Petrie, Limited, Toronto.

SAW SWAGES, AUTOMATIC FILERS
E. C. Atkins & Co., Hamilton, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.

SAW TABLES
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

SCRAPING MACHINES
Baxter D. Whitney & Son, Winchendon, Mass.
Chicago Machinery Exchange, Chicago, Ill.

SCROLL SAWS
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Shurly Dietrich Co., Ltd., Galt, Ont.
E. C. Atkins & Co., Hamilton, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.

SECOND HAND MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
H. W. Petrie, Limited, Toronto.

SHAPERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Samuel J. Shimer & Sons, Milton, Pa.
Baxter D. Whitney & Son, Winchendon, Mass.
H. W. Petrie, Limited, Toronto.

SHAVING COLLECTORS
Sheldons, Limited, Galt, Ont.

SINGLE SPINDLE BOXING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.

STAVE SAWING MACHINE
Baxter D. Whitney & Son, Winchendon, Mass.

STORE FIXTURES, FITTINGS
Reflector & Hardware Specialty Mfg. Co. Chicago, Ill.

SURFACERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.
Chicago Machinery Exchangefi, Chicago, Ill.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

SWING SAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

TABLE LEG LATHES
Berlin Machine Works, Ltd., Hamilton ,Ont.
Chicago Machinery Exchange, Chicago, Ill.
Thos. White & Sons, Paisley, Scotland.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.

TENONING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
H. W. Petrie, Limited, Toronto.

TOOLS (Hand)
J. A. Fay & Egan Co., Cincinnati, Ohio.
Samuel J. Shimer & Sons, Milton, Pa.

TRIMMERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

TRUCKS
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Sheldons, Limited, Galt, Ont.

TURNING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.
H. W. Petrie, Limited, Toronto.

UNDER-CUT SELF-FEEDING FACE PLANER
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.

GUMMERS, ETC.
E. C. Atkins & Co., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

UNIVERSAL WOODWORKER PLANER
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
W. A. Elliot, Bathurst St., Toronto, Ont.
H. W. Petrie, Limited, Toronto.

VENTILATING APPARATUS
Sheldons, Limited, Galt, Ont.

VENEER DIERS
Sheldons, Limited, Galt, Ont.

VENEER PRESSES (Hand and Power)
Hydraulic Press Mfg. Co., Mount Gilead, Ohio.
Black Bros. Machinery Co., Mendota, Ill.
William R. Perrin & Company, Toronto, Ont.

VISES (Band Saws)
Shurly Dietrich Co., Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
H. W. Petrie, Limited, Toronto.

VISES (Pattern Makers')
J. A. Fay & Egan Co., Cincinnati, Ohio.

VISES (Circular Saws)
E. C. Atkins Co., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
H. W. Petrie, Limited, Toronto.

WAGON AND CARRIAGE MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.

WINDOW FRAME MACHINERY
Smith & Phillips Mfg. Co., Chicago, Ill.

WOOD PULLEYS
Canada Machinery Agency, Montreal.

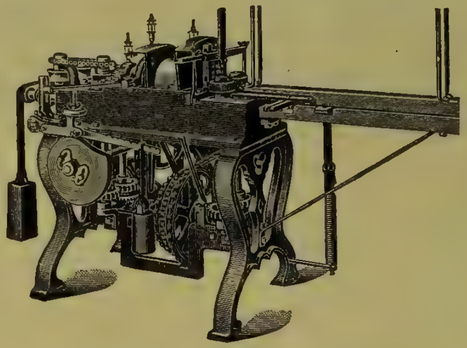
WORK BENCHES
Canada Machinery Agency, Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.


SIMONDS
SAWS

Volume Thirteen TORONTO, APRIL, 1913 Number Four

Canadian Woodworker

Increase Your Profits by using OBER LATHES, SANDERS and other Wood-Working Machinery

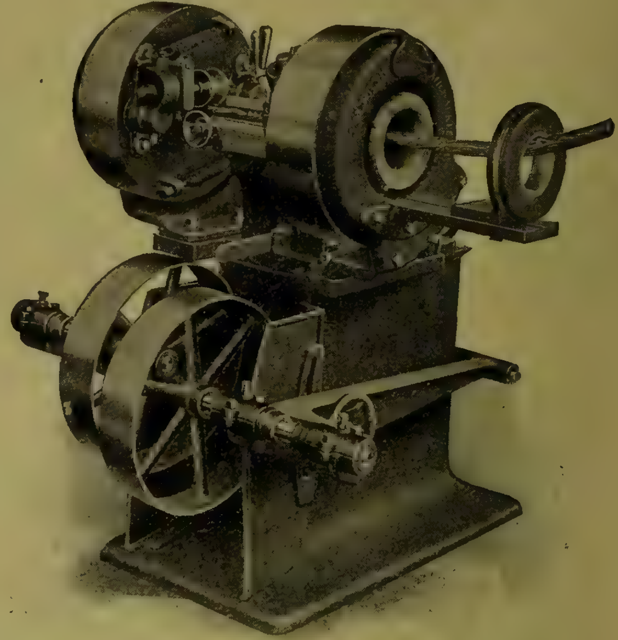


Write for free catalogue

The Ober Mfg. Co.

3100 Bell St., Chagrin Falls, Ohio, U.S.A.

You Ought to Investigate the No. 6 Nash Sander for Your Bent Posts, Handles, Etc.



Users think a great deal of it. You will too, when you get one.

J. M. NASH. Milwaukee, Wisconsin
842-848 30th. St.

The Morehead Back to Boiler SYSTEM

will return that water in your Steam Lines to your Boiler.

IF the amount of your steam line condensation is of any volume at all don't waste it. Send for a "Trial Trap" and see how quickly the Morehead System will show savings in your coal bills, repair expenses, etc., not to mention the great improvement in your heating system.

From 20 to 40 per cent. of the heat units in the water of condensation is lost by cooling the condensation down to accommodate a steam pump.

Morehead Traps return the condensation with its full heat content direct to your boiler with practically no drop in temperature.

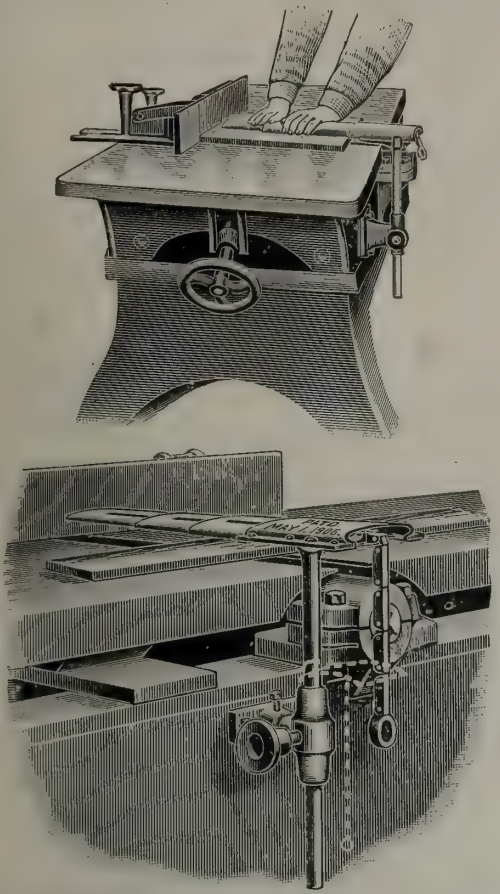
MOREHEADS TRAPS are being used everywhere on Heating, Drying and Cooking propositions of every kind, from straight pipe work to fan stacks and under vacuum conditions without regard to the difference in pressures between the apparatus drained and that carried on the boiler and without regard to the location of the apparatus drained, whether above or below the water line in the boiler.

There is a Morehead Trap for any kind of service. Just state your conditions and we will send you a Trap for free trial.

DEALERS AND AGENTS: The Morehead System appeals instantly to users of steam. If you are in territory not already covered the opportunity to secure this valuable agency should not be overlooked. Application of responsible dealers in unoccupied territory will be given immediate attention.

CANADIAN MOREHEAD MANUFACTURING CO. Ltd., Woodstock, Ont.

Canadian Representatives: George W. Cole, Woodstock, Ont.; Robert S. Bickle, Winnipeg, Man.; H. E. Kirkham, Montreal, Que. Robert Hamilton, Vancouver, B. C.



False Economy

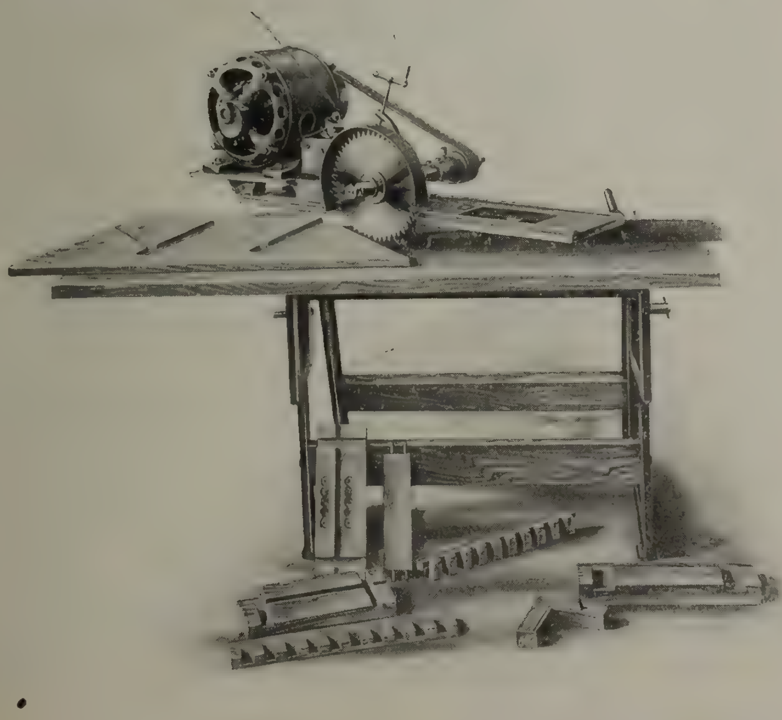
THAT only will fairly describe the policy of continuing the risk of accidents due to a neglect to furnish proper guards for Jointers, Wood Shapers, Band and Circular Saws and Stamping Presses.

Court records are constantly being made of cases where the comparatively trifling cost of these appliances are being saved only by incurring heavy damage verdicts with added law costs.

Save money by writing at once for Catalogue and information relative to Guards suited to your machines to

The Jones Safety Device Co.
LIMITED
152 Dundurn St., HAMILTON, ONT.

THE ELLIOT WOODWORKER



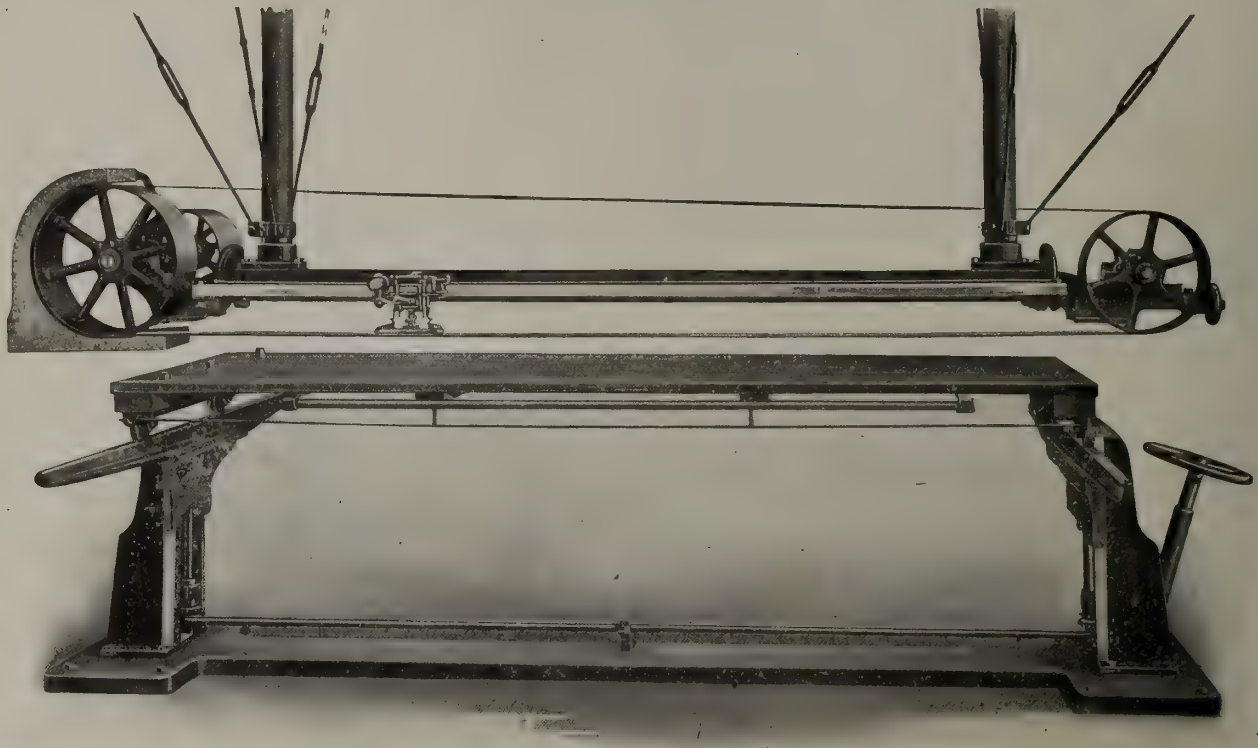
Patented Canada, 1910, Patents Pending U. S.

The illustration herewith shows the Elliot Woodworker, No. 2, set for mitering, also samples of work done on the machine. For cross-cutting and mitering, housing out stair strings and other routing, it works on the principle of a swing saw, the carriage, with motor and saw, being drawn to and fro by hand. For ripping the carriage remains stationary. It is a combination of eight machines in one. With it you can rip, cross-cut, miter, rabbit, groove, plow, bore, stick mouldings, grind tools, or almost any kind of work required. It is fitted with a motor, and can be run by any house current; it can be carried from room to room, or out-doors for cutting joists, rafters, etc. One of the greatest features of the machine is the stair routing—a 16-ft. stair string can be housed out in twenty minutes. You can save 30 to 40 per cent. of your labor bill by the use of this machine.

Write for particulars to

W. A. ELLIOT
TORONTO, ONT.
Factory: Bathurst and College Sts.
Phone Col. 1496

BELT SANDER **C.M.C.** **BELT SANDER**



Lucas Belt Sander

Suspended Type

A Sander designed for sanding large flat surfaces such as counter tops, and house trimmings.

The capacity of this sander is large enough to allow stock 18 ft. long and 6 ft. wide to be easily worked.

Table is adjusted to the desired height by the large handwheel.

The carriage is the Lucas Pattern celebrated for its simplicity and ease of operation.

Bulletin No. 430, illustrating and describing this machine sent on request.

CANADA MACHINERY CORPORATION, LTD.

GALT - ONTARIO

Builders of High-Class Woodworking Machinery and Machine Tools.

Canadian Woodworker

Canada's Only Woodworking Paper

Published in the interests of Planing Mills, Saw Mills, Furniture and Piano Factories, Implement and Carriage Works, Boxmakers and Coopers, Carpenters and Builders.

The Circulation extends from the Atlantic to the Pacific and covers thoroughly all classes of Woodworkers in this immense territory.

Wooodworker Publishing Co., Limited

Nicholls Building Toronto, Canada

United States: E. J. MACINTYRE, 4057 Perry St., Chicago.

SUBSCRIPTION RATE.

Canada, United States, $1.00; Great Britain, Australia 4s 6d.; other countries $1.50 per year. Advertising rates on request.

Vol. 14 April, 1913 No. 4

Co-operation as a Business Asset

IN the woodworking field, as in every other line of effort, success depends largely upon the measure of co-operation obtained among the employees. Individual ability, competence and honesty of motive are required in workmen, but if the superintendent or his understudy stir up an element of discord, that element will be a cancelling factor that will eliminate the others above and below the line. The time has passed when the individuality of the workman can be purchased with his services at so much a week. The man whose services count for little will have little to say, for the reason that the ideas that are necessary to promote an expression of opinion are lacking. The man with the ideas will state his opinion and stick to it, not caring to merge his individuality in another's. And so there are two types of workmen to consider. The superintendent must be the third type, possessing in addition to other good points those rarest of all—ability and tact. It is lack of tact that prevents many a man from succeeding to an executive position. As a workman he may be able, industrious and conscientious, but in the higher capacity he fails utterly. Not infrequently is chaos evolved out of order through misplaced authority.

The responsibility for the above observations is our own, but the inspiration came from a letter received from a progressive woodworking concern at the coast, who concluded an interesting letter relating to their operations with the following note, which might easily furnish a text for a better sermon than this:

> "We are trying to create in all our working force a personal interest and pride in the work. We find this personal interest productive of economy, helpful in operation and tending to improvement in the quality of the work. Our theory is, 'Each man's work should be that man's pleasure.' We realize that the more nearly we attain that ideal so much the better is it for the prosperity of the firm, to say nothing of the stimulus to harmony among the employees and the greater pleasure derived from working under such conditions."

The Victoria firm enunciate a principle that will work wonders. It is the "Open Sesame" to enthusiasm. Who ever heard of a successful man who was not an enthusiast. All enthusiasts do not reach the goal for which they strive, but they make wonderful progress. Napoleon did not fulfil his ambition to conquer the world, but his enthusiasm made him one of the greatest men of all time—and, what is more to the point, he transmitted his enthusiasm to his men, who regarded him as a god.

Success, then, in the industrial field, as in all others, depends not alone upon ability. There must be harmony, co-operation, enthusiasm. Be careful in the selection of your superintendent. By all means let him have a good working acquaintance with every branch of the trade, but see that he has tact—and a measure of that enthusiasm which communicates itself to others and creates the desire to achieve something out of the common run.

The Good Fellow

DON'T try to be a good fellow. It so often stands in the way of real success. Don't worry if you don't have the good-will of everybody in authority and out of it. If you have a real boss, you must be something more than a good fellow to please him. You may kow-tow and carry your little tales to him, but in the long run he will despise you for it. Usually the good fellow is the ring leader of a little coterie which goes along playing snucks and knocking every other fellow who tries to do his duty independently of what people think. There is always one duty that commands your attention first, and that is, to do your downright, level best, both with your hands and your brains. Your duty is to your firm. It may sometimes be disagreeable and make you unpopular, but you must do it. You may lose the good-will of some of your fellows, but that does not matter; you may even lose the good-will of your boss, if he fails to understand you, but that should make no difference. You are not supposed to pamper everybody's vanity. You are not supposed to spare the feelings of sensitive, bad tempered people about you. You are supposed to act honestly, fearlessly and fairly, and if you get fired for it, you must do your duty.

But don't be simply a good fellow. If you do, you will be nobody. Remember that those on the floor about you have eyes to see and minds to form opinions, and while you are grandstand-playing to the boss, some clean-minded fellows are sizing you up and set-

Concentration

The world and time materials are
From which we carve success;
The graving tools ourselves must be,
However great or less.

The graver keen and tempered is,
And neither fast nor slow—
As faithful to the task it bends,
And forms of beauty show.

Held in the hands of fate are we
As tools for Wisdom's will;
Our edge and temper we must keep.
Our duty to fulfill.

ting you down where you belong. And the boss will get you in time. Keep away from cliques, and do your work with single mindedness. Stand firmly, but modestly and quietly for what you know to be right; speak your mind when you know that to speak it is for the best interests of the organization. Put the old organization first every time. Swear by it, and swear at everybody who is against it. That is excusable profanity. Remember you are working for an idea—an ideal—not for anybody's favor—you are working for the good old organization to win. Your character goes to make up the character of the organization—you want it clean.

Don't be simply a good fellow.

Cleanliness in the Factory

By S. P. Eiler

ONE of the things that retards the progress of work through the whole factory is a lack of cleanliness. By this I mean the cluttered-up condition that too frequently prevails under ordinary shop conditions. The floor is covered with raw material, waste strips and blocks, and material in every stage of manufacture up to the finished product. The floor is so encumbered that trucks cannot be economically used and the material is passed from machine to machine or carried to the next operation. To do this the material must be picked up from the floor, passed through the next machine and carried to the next operation over or around piles of other material.

All this is expense in time and labor, for the work required is not productive, as it is spent in overcoming obstacles and in carrying around material over an uncertain and dangerous footing. Such congested conditions are not necessary, even in the small and crowded factory, and they are very far from being efficient conditions. The remedy is to clean up the factory all the time; remove the finished work to a loading shed or warehouse or a corner reserved for it only. Promptly dispose of the waste blocks and strips that cannot be ripped into smaller material and used for moulding. Clean out the shavings that accumulate and at all times keep a clean floor.

To keep a clean floor get all the factory trucks that are needed. This is generally a few more than are ever provided. Keep the material on the trucks and off the floor. A truck will hold more material than can be piled in the same space on the floor, and can be quickly and economically moved around. Work the material off one truck and on to the next one at the other end of the machine. One factory of my acquaintance became so congested that it absorbed three dozen trucks with such a relief that two dozen more were ordered and used in handling the work. As the trucks went into commission, the stock came off the floor, and where there was a carload or two of material on the floor at one time, at the present time scarcely any is ever allowed to reach the floor.

It is much easier for a workman to handle small pieces, as well as large ones, from the height of a truck than it is to have to stoop over and reach down to the floor for them. The little things that make for convenience, ease and rapidity of handling are the ones that it pays to provide. I sometimes think that if some of the managers had to work under the conditions that they provide in their factories they would shortly correct some of the unsightly and uneconomical practices that prevail in their shops. Bettering the conditions that hamper the men who do the work is an easier way of increasing production than providing more factory or more workmen.

Wasted Motions and Energy

By Geo. Neal

WE have had the loss of power in friction figured out for us on pretty fine, hair-splitting lines, and have had demonstrations of the wasted energy in a machine running empty, but have hardly yet touched the subject of the personal energy and motions wasted in handling machinery, and the material being worked on machines, writes George Neal in The Woodworker. We know that the secret of capacity in a saw mill is to keep the saw in the log as continuously as possible and not have it running idle too much. We often have right here, too, one of the plainest cases of wasted motion and energy.

A sawyer of the rambunctious, rip-snorting kind will run his carriage back from 2 to 4 ft. farther than is necessary, bring it to a sudden stop, and perhaps jerk it back and forth a time or two, maneuvering for position to turn his log. He works himself and the carriage men hard, and it looks like he is simply tearing the bone out of things, but often he makes less lumber than the quiet man who makes no unnecessary moves of either himself or the carriage, but stops easily at the right place every time, keeps the saw in the log, with but little lost time or motion, and doesn't seem to be rushing things at all.

In the planing mill and factory we have in different form some of the same waste of energy and motion. One man will make a half dozen unnecessary movements in picking up a board and putting it in a machine; another will have the truck containing his material so far from the work that he must take two or three useless steps each time he gets a fresh piece; another will get the stock on the wrong side for convenience in handling. And so it goes; all around us we are wasting personal motions and energy, as well as letting machines run idle and waste power. We have so far given but little specific attention to a study of these with a view to conserving this waste.

There are what we call efficiency experts studying and pointing these things out now, and often reducing them to such hair-splitting extremes that they become so aggravating as to interfere with their usefulness. That is what generally happens when the pencil experts get to work on an idea of this kind; they chase it into so many nooks and corners, and pick up so many picayune points, that they themselves often fall into the same error they are trying to correct, of wasting time and energy. Yet, taken rationally, good work in efficiency can be done by making a study of the wasted energy of unnecessary motions. Study not only your own movements, but also those of the stock you are handling. See how many of them are really productive of actual results, and how many are not. Then see how many of the useless ones can be eliminated by a little thought and practice. It is one of the best places in the world to save a form of waste that has gone too long unnoticed.

ALL is not gold that glitters. By the same token one might observe that all is not antique that looks old. The reminder comes from an advertisement in a London paper which runs as follows: "Polisher and faker wanted for antiques. Permanent job for good man." Accom-

panied are directions informing prospective "fakers" where to apply for the job. It is stated with a delightful frankness that the work is in one of the famous cathedrals, much visited by tourists. Those of us who are experts at discriminating between the good and the bad in the line of antiques will derive much satisfaction, on our itineraries in the Old Country, from the reflection that some of our misguided travelling companions may be fooled into taking forbidden souvenirs of antiques that represent the art of a faker—a man who earns a commonplace living by turning new into old.

The Art and Practice of Veneering

A reminder of the success that is still attained by hand and eye in the beautiful matching and working of veneers, showing also how the small shop within its limits may have admirable scope for practical advancement.

WITH the veneering business as in the printing trade some of the finest and most elaborate, interesting, and valuable work is done by hand, writes C. R. Mason, in Wood Craft. We may stand with admiration and a certain degree of awe watching an enormous Hoe press printing newspapers, folding and delivering them as fast as one can wink, and we marvel at the wonderul intricacy of the mechanism involved in the work, but just the same some of the finest work of the printer's art, that which we store away carefully and admire for its artistic appearance, is done tediously and slowly by hand.

It is pretty much the same way in the veneer business. A man running a little one-horse shop may feel envious of the big establishment with all the modern up-to-date machinery, with glue machines having automatic feeders or regulators, and everything operated on scientific principles. All of this may make the one-horse man feel like he doesn't account for anything in the veneer business and he never will amount to anything for he is so far behind in the race. Yet the fact remains that the finest veneering is done by hand, and often the most interesting work is to be found where people are doing a small quantity of work carefully by hand.

Where Some of the Finest Work is Done

Therefore, instead of the men doing small work, just doing a little incidental veneering by hand, being discouraged and feeling that they are not in the veneer business they should take pride in the fact that they are in position to do experimenting and do elaborating that is not practical in connection with the quantity of work done in the larger institution.

Whenever you see a piece of furniture in a show window with very elaborate figures, very carefully matched so as to bring out striking effects, you can just bet that a great part of this work at least was done by hand. It required careful preparation and individual fitting of the pieces to secure the matching of figures and it is this way all the time. It has been since the very earliest days of fine cabinet work. Way back in the days of Roman and Egyptian luxury there were wonderful results obtained in working and finishing wood and it was all done by hand.

Two Distinctive Paths in Veneering

There are really two distinctive paths in veneering in relation to this question of magnitude and quality in the business. One is that path that leads to an impressive magnitude of business itself and the other leads to impressiveness in individual work. The small man with a hand shop has a chance to develop either or both to a certain extent. Magnitude is the thing that comes generally as business develops and grows and it brings with it the machinery and equipment necessary to handle it. Skill in veneering comes from a study and understanding of the business and one may develop as full a measure of skill in a little hand shop doing special jobs as is practical in the biggest institution in the country.

This preamble is written in part to encourage those who are operating in a small way to look up and to feel that instead of being insignificant they are in a way just as important in the veneer business as anybody else, and have just as many interesting things for discussion and have as many opportunities to learn things worth while to them from reading about different points in connection with the veneer business as anybody else.

Where New Ideas Originate

Really the economy of management in the veneer business begins right in the hand shop and with hand work. It starts with the little hand glue-pot and the hand brush for spreading. The mechanical appliances are merely modified forms of these and just as the same rules hold in setting the knife on a planing machine that hold in setting a hand plane so do the same principles of glue spreading obtain in the big machines as obtain in spreading glue with a brush by hand.

The one thing for the man using hand pots and brushes to guard against is that of using stale glue. Where a man is using only a small quantity of glue there is a disposition to keep it standing melted in his little pot from day to day. He adds a little glue or a little water from time to time and is slow to realize the injury which may be done by retaining stale glue. The ideal plan, of course, is to clean up every night, not carry anything over for tomorrow that was used today.

It takes a little time and means wasting a little glue, but it is an excellent practice to clean out the glue-pots and the brushes every night, throw away whatever is left over and start in absolutely fresh in the morning. You will feel at first that it is extravagant waste, but by and by if you follow this practice you will get into the habit of gauging the amount of work you have to do each day and will not prepare any more glue than you need.

Wasting Glue to Save It

Consequently the waste will not amount to much, while the quality of glue work will be considerably above what it would be if you kept using stale glue

and leave the pot over from day to day with simply additions now and then.

Another thing to guard against is too much cooking of glue. You don't need to cook glue at all. You simply add moisture and heat to glue to reduce it to a liquid form so that it will flow freely, and you should not keep this heating up too incessantly nor get it too hot at any time. If you are not using the glue regularly the heat should be allowed to go down very low so that it is barely kept warm and in condition so that when wanted it can be heated up a little more and made to flow freely in a few minutes.

A little attention to a regulation of this kind will save letting the glue boil away all day, evaporating the moisture, getting thicker, and losing some of its strength. Be very careful about applying too much heat to make the glue flow. If it needs a little more water it is better to add the water than to overheat it because the water will evaporate out of it without injury, whereas when you get it too hot it is not practical to restore its strength.

Where there are jobs of some magnitude to do, that is, jobs which involve spreading quite a large surface with glue, one of the trying things is to get the glue properly spread and the work under pressure before it sets or chills. To attain this result it is often the case that the glue man will work rapidly, and in his hurry and bustle may neglect to do his work as carefully as he should.

There are ways to save time in this or rather to safeguard the glue setting so quick. Of course, the first protection is to have an inclosed room where there are no drafts because a current of air will take up moisture and chill the surface of the glue quicker than almost anything else.

Then, the next best thing to keep glue from chilling is to have your stock warm, even hot. There is really no other strong call to have stock heated when it comes into the glue-room, but the hotter the stock is the longer it will carry the glue in a fluid state and prevent setting. That is why where hand gluing is done it is generally essential to have a hot box in which to heat cauls and the stock to be glued.

With the stock and the veneer and the cauls all made pretty hot from a steam-box, that is, from an inclosed box with a steam coil in it, one can take more time preparing the work to go into the presses and insure getting a better job. Sometimes even where the glue seems to have chilled a little and has not set as well as it should one can start it to flowing again by getting a caul right hot and putting it over the thin face veneer. The heat extending through the veneer will warm up the glue and make it flow.

The Steam Bath for Stock

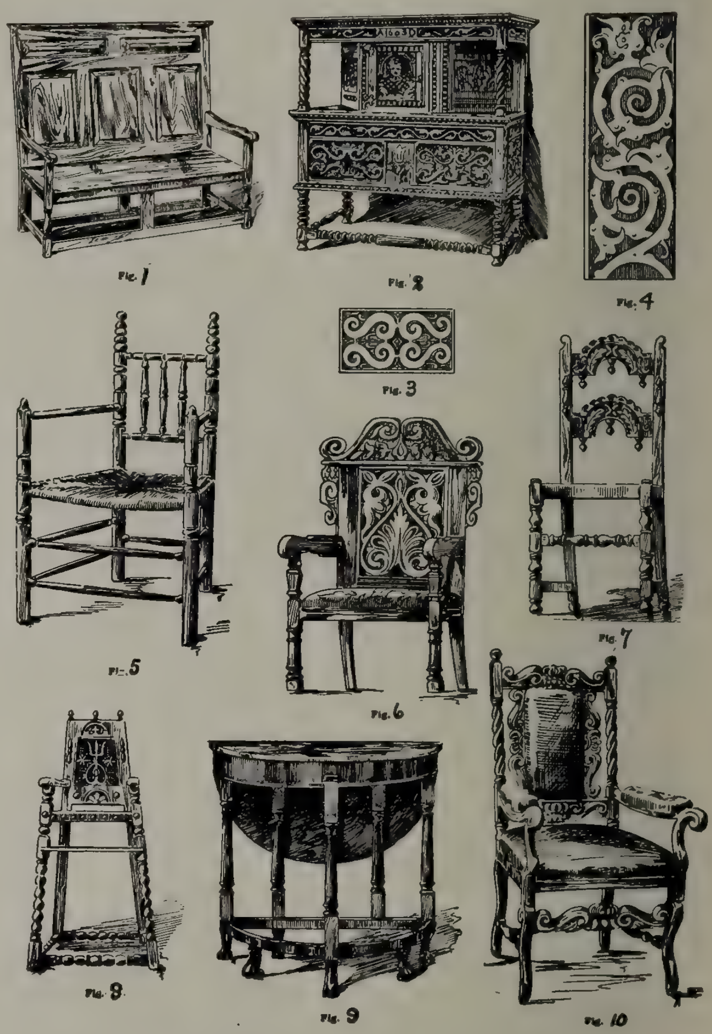
Having stock hot this way when glue is spread on it makes it hungry for moisture and consequently sometimes it will drink up more of the glue than it would otherwise. If you have plenty of glue on the surface this simply means more glue used, but if the glue is spread rather thin it may mean a poor joint.

There is a way to keep stock from taking up so much moisture out of the glue by sprinkling, sponging, or steaming the stock and getting a little moisture into it before spreading the glue on it. A little wet steam is probably the best thing, if you have a little steam jet in a sort of open box or something where you can steam the wood a little and get the warm moisture to it. Not too much should be used, but enough to give it a drink, so to speak, keep it from taking so much of the moisture out of the glue when spread on it. You will then find that the glue will spread farther and will stay in it until it evaporates slowly into the air.

The Influence of Antique Models on Present-Day Furniture

By Paul D. Otter

IN surveying the history of furniture as a treatise intended for information and inspiration to many desiring to make furniture, I am inclined to confine our study almost entirely to English styles and periods—not that little merit is to be found in the work of Germany, Italy and France, and particularly France, but that French examples represent much



elaborate detailed treatment and extravagance of outline which would carry us far beyond our purpose. French influence, however, should not be discredited and is strongly reflected or worked in, as we shall see in our comparisons.

Beginning with the reign of Queen Elizabeth (1558-1603) we have the "Elizabethan Style," which in its influence extends far into the reign of her successor, James I, and indeed it is hard in many cases to tell "t'other from which"—the Elizabethan from the "Jacobean," as it was called.

Political and social conditions were reflected more in articles of domestic use in those days than they are now. The arts and industries were encouraged and

patronized more by the royalty and people of the court, and such patronage continued for a long period during each reign. It is to this royal fostering of the arts and industries of the political divisions and periods of former times that we derive much of our inspiration and influence in matters of art and literature—we draw deeply from these well springs.

Furniture Much Ornamented

The early part of the Elizabethan period was characterized by much ornamentation, principally carving, the frames designed quite with the purpose of having the cabinet work a foundation for elaborate ornament of enriched turnings, carved panels, strap work, bands and borders. Not until well into the period of the "Jacobean" Style—James I. (1603-1625)—was there evidence that the carver worked for the joiner instead of the joiner building frames for the carver to decorate.

The cabinet maker was then beginning to work for recognition more in the excellence of his joinery and by the display of molded and mitered panel work, and while the general forms of the overenriched and the plain are quite similar, as the Jacobean Style is reviewed and we sit back and read of the history of the time, we are impressed that political and social conditions do have an influence on the character of the clothes we wear and the furniture we use, for when Cromwell became Protector he and his followers certainly would have none of the things of the court—its grandeur, extravagance, tinsel, carvings and foolishness— and we look into the homes of his time and see that there was considerable modification to conform all things to the simple and useful. Note the severely plain paneled settle in Fig. 1 on the opposite page. By referring to the carved "court cupboard" in Fig. 2, the essential features of the Elizabethan are shown. There are few surfaces of rest. Under analysis, however, the sturdy form of the structure or carcase commands attention.

Figs. 3 and 4 represent the character of carving employed, being much in the nature of bands or squares, the design being cut into the wood much after the manner of type, with the main detail left quite flat.

Fig. 5 is a chair much in vogue during this period and is here used to illustrate how much our village chair makers in Colonial days employed the lathe in producing similar patterns for common use. Figs. 6, 7, 8 and 9 in their order illustrate quite sufficiently the developed features of the Jacobean Style, while Fig. 10, although Jacobean, is of the time of Charles II., showing considerable French influence, particularly in the full carving and the shape of the legs.

Practical Notes on Wood Finishing

In which Walter K. Schmidt, Analytical Chemist, offers some helpful observations upon the relative merits of oil and water stains, with suggestions looking to the avoidance of common errors and the production of good work.

STAINING wood-work is an art that has been known for many hundred years. In some of the oldest books will be found formulae for making wood stains. Great pains were taken to get the right color. Sometimes wood was soaked for days and weeks. At times, the wood had to be boiled in the stain to get results. Extracts of wood, gum boche, dragon's blood, curcuma and many other substances were extracted with water, and the color partly changed with chemicals. From all this, it will be seen that the work was done very thoroughly in those days, says Mr. DeLeuw, in a paper read before the Illinois Master Painters' Association. The stains penetrated much better than do our modern stains, and once the work was done, it lasted almost forever. Nowadays, it would be impossible to do the work in the old-fashioned way. In the first place, it takes too much time and labor. Then, after the woodwork has been stained a certain color, there will be a change in the style of decoration, or the owner may get tired of the color. When water stains have been used, it is very difficult to remove the stain which must often be done before the color can be changed.

If the old-fashioned way of staining were still in use, it would be impossible to change the color of woodwork. Oil stains are far more easily removed than water stains. Therefore, it seems to me that where it is desired to have the wood thoroughly penetrated by the stain, and where the stain is expected to last for many years, water stain is to be preferred; but where there is a possibility that the owner may want to have the color of the woodwork changed within a few years, it is better by all means to use the oil stains.

In regard to changing the color of woodwork, it may be said that every day new colors are being thought out. This would seem as though it is not necessary to produce a stain that will not fade. However, manufacturers are working hard to discover a stain that will be absolutely fast. Water stains are generally faster than oil stains, but the day is not far distant when manufacturers will be able to put on the market stains that are absolutely fast. They are succeeding very well in their experiments to make oil stains faster in light, and it is only a question of time when they will produce an oil stain that will be perfectly fast.

The idea that all stains are made from coal tar is not true. It is true, however, that many stains are made from coal tar products; for instance, those made from benzol, naphthol, phenol and alizarine. Still others are made from salicylic acid, resorcine, tannin, etc. These substances are all chemicals, and are treated with other chemicals to get the desired color.

Very often the fault lies with the man who does the finishing instead of the coal tar. Over-saturation is harmful in staining woodwork. A piece will absorb just so much liquid stain, and no more. Woodwork that has too much stain will always hurt the varnish. To do satisfactory work, all stained woodwork must be wiped, when it is nearly dry, so that if there is too much stain on the surface, the surplus will be removed. After this a coat of shellac should always be applied when oil stains are used. Varnsh will never get

hard on an oil stain, for the reason that the acid in the color will prevent the varnish from drying. Where a coat of shellac is applied over an oil stain, this is prevented because the shellac not only hardens the stain, but keeps the acid from coming in contact with the varnish. The painter should be very careful that there is not too much oil stain on the surface when he applies the shellac. If the oil stain is not carefully wiped, the shellac may take part of the stain. Many oil stains are soluble in alcohol. As shellac is mostly always dissolved in alcohol, it can readily be seen what care must be used not to have too much oil stain on the surface when the shellac is applied. But that is not all. If the shellac takes up part of the stain, the stain will come through on the varnish when it is applied. A painter should never forget to wipe thoroughly any stain after it has set, and until it is absolutely clean. It will be seen from all this that oil stain requires more intelligent handling that water or spirit stains.

It is very difficult to make certain shades satisfactory in oil stains. In some shades it is impossible. Some shades, like gray oak, can be only made in water stains or from chemicals. Fumed oak cannot be made in oil stains at all, for the reason that oil makes the pores of the wood too dark. Gray oak can be made from iron nails dissolved in vinegar. These stains, however, raise the grain of the wood very much. It is, therefore, advisable to apply hot water on the wood, and when dry sandpaper before staining. In this way good results may be obtained.

Staining Woods an Art

Staining woodwork is, undoubtedly, an art, so never expect a poor workman to do good work in staining wood. For instance, if blue paint is applied to wood, the resulting color will always be blue. This is true whether the wood is maple, birch, mahogany, or any other wood. This is not at all the case with stains. For example, weathered oak stain will come out gray on white oak, a little more reddish on red oak, and greenish-gray on pine. Mahogany stain will turn out red on oak, brownish-red on birch, and still browner on mahogany. Therefore, never expect that the same stain will give the same shade on different kinds of wood. Stain does not act like paint. Paint has a body and covers the surface. Stain has no body. It sinks into the wood. The wood itself is the body. The stain is merely used to treat the wood.

The object in staining wood is to make it appear that which it is not—to imitate nature, such as making birch look like mahogany, or to make raw oak look as if it had been weathered for years. This cannot be done with paint, because paint covers the grain too much. Solvent stain sinks into the wood and shows the grain as clearly as ever. The workman must know thoroughly the nature of the wood he is staining.

Up to less than ten years ago, all stains were water stains. In this short time, manufacturers have made wonderful progress in improving oil stains. In the beginning, the only advantage in favor of oil stains was that they did not raise the grain. By pains and study, the manufacturers have been able to improve the oil stains so that to-day they penetrate as well as water stains, produce a clearer and cleaner surface, and are almost, if not quite, as fast as water stains. It is only a question of time when oil stains will be in every way as good as water stains. They require much less labor than water stains, but they must be more intelligently handled. Oil stains are the stains of the future. Except in cases where it is absolutely impossible to produce the desired shade in oil stains, they will be found in every way as satisfactory as water stains and superior to them in the finish they give, the ease with which they are applied, and the saving of labor.

Saving the Sawdust

THE boast of the packing industry that "everything but the squeal" is utilized, may soon be realized in the woodworking business without any qualification at all.

Sawdust has hitherto been a dead loss in most plants, although a few have used it as fuel and in the pine districts it has been more or less successfully treated for the extraction of turpentine.

Now, however, some genius has come to the front with a method for making warm, long-wearing and sound-proof floors from this material, combined with sand and cement.

Two and a half parts of clean sawdust are mixed with two parts of sand and one part of cement in the construction of sawdust floors; and it is claimed that for many purposes a floor so constructed is superior to one of straight lumber.

For industrial plants it is especially good, being as level and almost as long-lived as the best cement floor, with the great advantage of being practically noiseless.

A further advantage of such a floor in an industrial plant where men must remain standing at their work for long periods would result from its warmth and comparative elasticity.

Constant standing and walking on stone or concrete floors has been found to result in the disease known as "flat-foot," caused by the failure of the arch of the foot.

The sawdust floor can be kept as clean as one of concrete without greater effort; and, because of its elasticity, suffers less damage from falling objects, etc. It can be dented, but will not crack or break.

Where great areas must be floored, the sawdust floor commends itself particularly on the score of cost, since it can be laid for less than one-half the cost of concrete.

Its capacity to withstand hard wear commends it for the industrial plant and also for the floors of halls, churches, depots and other public buildings on which there is a great deal of wear.

Carpets can be tacked down on such a floor with less chance of injury than to a board floor.

The sawdust floor must be laid indoors to be a success, however; outside, where it will be subjected to extremes of temperature, it has been found to warp and crack after a short exposure.

The properties of sawdust as a sound-deadener have already become well known, and have been utilized to some extent.

In some public buildings, a false floor has been laid between the regular floor and the ceiling of the room below, and a layer of sawdust spread carefully over this false floor.

Wherever this has been tried, it has been found that the transmission of noise from a room so treated to the one below was entirely prevented.

By the addition of color to the mixture while in a semi-liquid state, pleasing monotone effects can be produced, in keeping with the decorations or character of the room or hall.

The Paine Lumber Company's Great Plant

An Industry Responsible For Two-Thirds of the Veneered Doors Made—Manufacturing Processes and Equipment

EVERYONE in the business of making or selling doors has heard of the wonderful and enormous plant of the Paine Lumber Company at Oshkosh, Wis. One of the most interesting departments of this plant is the one which is devoted to the making of veneers for use in veneered doors. The employees of the veneer mill number three hundred. Altogether the Paine Lumber Company has in its employ, in its various departments, three thousand people. In the old and new sash and door plant and planing mill two thousand three hundred of this total are employed. The executive office of the company gives employment to sixty-five people. We might go on at considerable length giving statistics of this nature in order to tell our readers of the ability of the company who turn out products in great quantities. This is not the object of the present article, however. The principal idea is to tell the readers of the Canadian Woodworker some of the interesting points in connection with the veneer plant and the door making plant.

When it comes to doors, this company stands pre-eminent among all the manufacturers of doors in the world. This truth is readily appreciated when one considers that, according to statistics gathered by the company, it makes two-thirds of all the standard veneer doors in the world. It has a capacity for turning out the surprising quantity of one million five hundred thousand doors in the course of a year. A Globe-Trotter would probably open and close quite a number of Paine doors during the course of his travels. Canadians may not realize it but they handle a great many Paine doors during the course of their ordinary business affairs. In many of the prominent hotels throughout North America these doors are to be found, and also in public buildings of various descriptions, a notable instance being the Parliament Buildings of Canada at Ottawa.

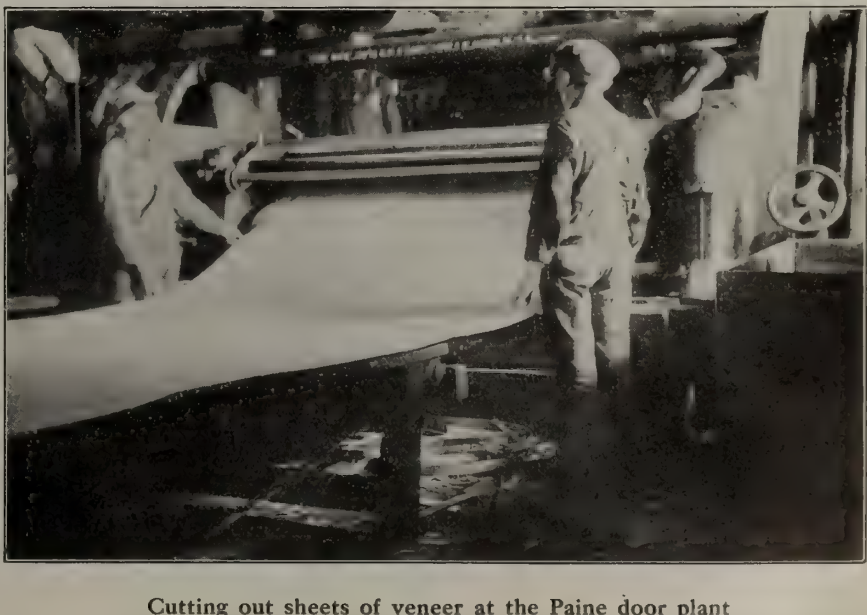
The Making of Veneers

In the making of veneers the company uses birch, oak, mahogany and basswood. Each wood gives its own distinct class of veneer. The logs which are to be manufactured into veneer are re-sorted at the plant, after a preliminary sorting which has divided the veneer logs from the sawmill logs. An electric railway carries the veneer logs to a cross-cut saw which cuts them into the proper sizes for the veneer machines. Then the logs are rolled into the boiling vats, which are arranged in a series. Each vat holds a number of logs and the water in it is kept continually at boiling point by a series of steam pipes down in the water. The logs remain in this for twenty-four hours and come out steaming hot, boiling water having reached every nook and corner in the wood, clear to the heart. The logs have actually been "cooked tender," and are ready for the hungry veneer machine with its one sharp tooth, a long knife of steel.

An electric hoist lifts the logs from the vat and they are then stripped of their bark and rolled along and hoisted into position for the veneer machine. The heart of the log is marked on each end so as to determine its exact centre. Then the log is lowered into the machine the ends being fastened into a heavy chuck. Lengthwise of the machine is a knife one hundred inches long. The chuck is revolved after the manner of an ordinary turning lathe. As the log turns around on the chuck it is pressed against the long knife and a sheet of veneer of the standard thickness of an eighth of an inch is peeled off like paring an apple. The sheets of veneer appearing like a huge sheet of leather, one hundred inches wide, and some times one hundred feet or more in length, is moved along smoothly over a long table by travelling steel chains. As the veneer sheet leaves the machine it passes beneath a row of huge lead pencils which mark black lines lengthwise of the sheet. These are necessary to indicate the outside face of the veneer, so that when the veneer pieces are glued up, this outside surface will be on the outside to prevent checking. As the sheets of veneer move along, big knives descend at intervals and cut them into large sections. Other knives again cut these sections into smaller portions of suitable size for the panels, stiles and rails of doors.

The core of each log is transported to a miniature sawmill to be cut into lumber. Nothing is wasted. The bark and other trimmings are sent to the "hog," a machine that cuts and grinds the pieces into smaller bits which are then fed into the furnaces.

After they are cut into the proper sizes, the veneers are carried in conveyors to the drier, where the pieces move slowly along between innumerable iron rollers that are heated. The atmosphere in the dryer remains at a temperature of 240 degrees. It is like a great oven, with asbestos lined walls, and is of such size that it takes just forty-five minutes for each piece of veneer to pass through. When the veneers come out they are dry and baking hot. The heat warps the eighth of an



Cutting out sheets of veneer at the Paine door plant

inch veneers somewhat, but not enough to retard handling. Steps are being taken to add a quick cooling arrangement to the dryer, so that the pieces will keep perfectly flat, the absence of any warping facilitating the handling of the pieces.

Assembling of Veneers

Next in its adventurous journey from log to door, the veneers upon leaving the drier, get a free ride on conveyors to the gluing department. Here men and women, in making the panels, rub the veneers through a machine that spreads a glue upon the surfaces to be glued together, and three pieces are assembled to make each panel. Each piece being an eighth of an inch thick, the resulting panel is three-eighths of an inch in thickness. The grain of the middle piece extends in a direction opposite the grain of the two outside pieces, and this crossing of the grain is the secret of the non-warping quality of veneer doors. The glue used is secured in South America. As fast as the employees place the three layers of veneer for each panel, these three thicknesses are laid upon large sheets of metal, and piles of these sheets are squeezed in hydraulic presses that exert a pressure of 800 pounds to the square inch. The panels remain in these for several hours, until the glue has become thoroughly dry. Finally, the panels, which come out of the presses perfectly flat, are trimmed at sawing machines and are then ready for the door department. For any one piece of veneer to pass through the evolution from log to panel requires in all only about eight or ten hours. There is no wasted energy, no pronounced interruptions in the various steps of the process. Everything moves along at a certain steady rate of speed, and not a hitch occurs all day long, except on rare occasions, when some certain machine balks or needs repairs. Clock-work precision is maintained and the result is a constant stream of panels turned out each working day.

Making the Doors

No less interesting is the door-making department to which the panels are taken from the veneer mill. In making the stiles and rails for the doors, small pieces of soft wood are glued up in strips and dovetailed together by eleven Linderman Dovetailing Machines and the veneers then glued upon these fillers, as in making the panels. The outside edges of the stiles are strips of the same wood as the veneers, so that the soft wood filler does not show at all. Cull portions of logs are used for the filler, thus utilizing what would have been unavailable years ago when a carpenter spent days making a single door of the old style.

Machines bore holes in the rails for the dowels, which are little round sticks of hard wood that are turned out by other machines, and also glue the dowels in to the rails. Other machines place glue in the holes in the side lengths or stiles and all the parts—panels, stiles and rails—are properly assembled and a power clamp or "squeezer" presses all the parts together tightly. The door is now ready for finishing. The surfaces are sanded smooth by powerful machines that sand both sides at once. Some doors have six panels, others have two. Some have one large one, and still others have none, depending upon the styles catalogued or specially ordered. The no-panel door is used considerably in hospitals, on account of being without surfaces that would catch dust, and are, therefore more sanitary. Some veneered doors have handsome inlays put in. Others have openings of various shapes for glass. When finished, the doors present a most beautiful appearance on account of the rich effect in the grain of the veneer. A popular door turned out by the company has veneered panels, with the stiles and rails of solid spruce. Not a few birch doors are stained to represent mahogany, the resemblance being striking. Winconsin birch is called the American mahogany, and it deserves the term applied.

The Paine plant at Oshkosh is one of the wonders of modern manufacturing skill. The greatest wonder is how one firm can have worked up so widespread and good reputation that can sell such a large output.

The Best Method of Finishing Oak with a Polish

A painter in one of the Western States having to do a job involving the finishing of oak with a good polished surface, wrote the Painters' Magazine for information. In reply to his questions the authority named offered the following:

First have the wood well sandpapered, cleaning up any soiled places; then thin a good mineral paste wood filler (that made with straight silex in the pigment being best) with pure turpentine to the consistency of medium bodied varnish; apply it with a good brush and rub it well into the grain and pores of the wood. When fairly well set, which is when it begins to show flat, you can rub it into the wood with a pad made by glueing leather onto a block of wood, always rubbing across the grain. For round moldings of balustrades have a long strip of leather to draw back and forth around the work. Fill only as much surface at a time as you can wipe off before it sets too hard to wipe off without rolling up. Wipe off with tow or excelsior shavings all the filter except that which is in the grain or pores, and be careful to have all the grain and pores level full of the filler, because upon that feature the success of your work depends. All rubbing and wiping must be done across the grain. Give the filler all the time to dry you can, but never less than thirty-six hours, especially where the grain is rather open. When dry go over it lightly with No. 0 sandpaper to take off every particle of filler left on the surface. The cleaner you wipe off the filler the cleaner the finished job will be. If you desire your oak stained it is best to have the paste filler colored, and you can obtain it from the manufacturer in the natural, in antique, golden or weathered effect, so that you need not stain the wood first.

If you want to do high-grade work it is well to examine the filler surface with a magnifying glass to see if the pores are well filled and no pinholes visible. If there are such defects it is best to go over the surface with the filler a second time, but have it of thinner consistency than at first, and repeat the operation of rubbing, wiping off and sandpapering. Now you can apply one or two coats of white shellac, which, when hard, rub down with fine sandpaper; then put on a coat or two of hard oil finish or cabinet rubbing varnish and rub down with curled hair or hair cloth to dull the gloss. The shellac varnish may be omitted but in that case an extra coat of varnish will be needed.

If you want merely a good eggshell gloss rub the last coat with raw oil and flour of pumice and wipe dry with soft cloth. For a good polish rub with flour of pumice and water first, then wipe dry and polish with rotten stone and sweet oil.

For high luster apply a coat of cabinet finishing varnish on the rubbed varnish surface and omit rubbing this.

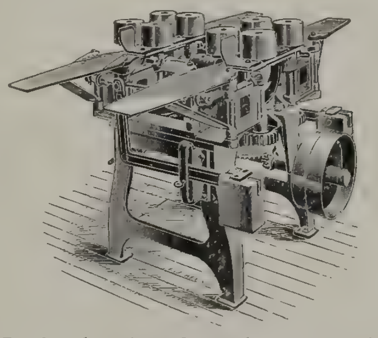
An Up-to-date Box Factory at Maisonneuve

Electrically-Operated Machines, Handling Facilities, Skilled Workmanship and Other Factors that Contribute to the Expanding Trade of Messrs. Abel, Fortin & Company

THE box factory of J. P. Abel, Fortin & Company is situated in Desjardins Ave., Maisonneuve, a suburb of Montreal which is more identified with boots and shoes than with the lumber interest. It is a medium sized factory, consisting of two storeys, with two yards, and good shipping accommodation. The building was originally a sash and door factory, but about four years ago it came into the possession of Messrs. J. P. Abel, Ernest Abel, and A. E. Fortin, who have been connected with the woodworking industry for many years. Naturally the beginning was small, but gradually the equipment and trade was increased, and to-day they have a moderate business, which is still expanding. Mr. E. Abel looks after the practical side, while Mr. Fortin attends to the bookkeeping and financial ends.

On the ground floor is situated a 100 horse power Allis-Chalmers-Bullock motor, with the potential starter, the power being supplied by the Montreal Light, Heat & Power Company. Up to a recent date the power for running the machinery was supplied by a Leonard engine and Eagle boiler, which consumed all the shavings and waste products; but the firm are of opinion that electricity is more economical, and they have installed the necessary electrical equipment. This involves the accumulation of a large quantity of shavings and sawdust collected by means of a blower, and this is conveyed from a shaft to a baling press made by Dederrick & Sons, Albany, N.Y. When baled the shavings are sold for various purposes. On the ground floor there is also the filing room, the saws being supplied by the Simonds Canada Saw Company, Limited, Montreal. Much of the lumber is delivered by the C. N. Q. Railway, which has a line right alongside the factory. It is then conveyed by means of hand trucks to the band re-saw, made by MacGregor, Gourlay & Company, Galt, Ontario, which cuts the lumber lengthways, taking 1 in. to 6 in. in size. The planer, to which the boards go next, has a capacity of 15,000 feet per day, and is by Cowan & Company, Galt, Ont. The other machines on the ground floor are a double surfacer and a planer, dresser and matcher, double cylinder, and a rip saw for scantling, by MacGregor, Gourlay & Company, and a 13-in. sticker by the Canada Machinery Corporation, Limited, Galt, Ont.

After the lumber has been dealt with here, it is stocked so as to be handy for the cut-off saws, of which there are three, one being supplied by Cowan & Company. The boards are cut into the requisite lengths and then sent to the rip saws and ripped to width. The waste is stored in racks, according to size, ready for use when orders are received suitable for this description of lumber. Two box board matchers are on the same floor, one by Cowan and the other by Luther. The waste that is left is cut into lengths and sold, the firm thus disposing of every bit of lumber that comes into the mill.



Luther box board matcher installed at the Abel-Fortin plant

The next process, after leaving the matcher, is the nailing, for which there are two machines, supplied by the Morgan Machine Company, of Rochester. One does the cleating of the ends, and the other completes another portion of the job by nailing the sides, this being known as a twelve nail machine. The covers and bottoms are put on by hand labor, the men being very expert in this portion of the business.

The firm make cases and boxes, as well as crates of all kinds. For certain boxes, a combined disc and

Messrs, Abel, Fortin & Company's box plant at Maisonneuve, Que.

drum sander is used, in order to give a better finish. A general lumber business is also done, a specialty being made of dressed lumber. For cases and boxes spruce, basswood, red and white pine are mostly used, 5/8 to 3 inch being the general sizes.

In the yard there is a moulding shed for the storage of moulding, of which many descriptions are made. Behind this is situated the stable.

Competition in box manufacturing is pretty keen, and it is made all the more so by the big rise in com-

Two of these open back nailing machines, made by the Morgan Machine Co., Rochester, N. Y., are in operation at the Abel-Fortin factory.

mon grades of lumber, which, of course, are entirely used in this section of the trade. The common ends, in addition to being dear, are getting more scarce, and this is naturally a handicap to manufacturers. It is difficult for firms in the business to get consumers of the finished article to pay prices which will cover the higher rates box manufacturers have to give for the lumber, and it falls to the lot of firms to economize in every way and not to waste a stick of wood which can be turned to account. From present indications it looks as if even higher rates will rule in the lumber market, especially if building goes on at the present rate.

Replace all guards and safety devices when through making repairs, and before machinery is started.

The superstitious man can find an excuse for all his bad luck and shortcomings during the year 1913, for look at that terminal pair of figures.

The Edgewood Lumber Company's plant at Castlegar, B.C., was destroyed by fire early this month at a loss of between twelve and fourteen thousand dollars. The plant will be rebuilt.

Seepage Through Staves

THE manufacturer of tight cooperage is particularly interested in white oak, because his most valuable staves are made from that wood. The staves are valuable because when made into barrels the liquid contents will not seep through and escape; but staves of red oak are unsatisfactory because of tendency to leak. The contained fluids seep through the wood; particularly does this apply to alcoholic liquors which pass through openings where water and some oils cannot pass. The superiority of white oak staves over red oak is well known to all practical coopers, but the reason underlying that superiority may not be so well understood by all. The red oaks are as heavy as the white oaks; they are as hard, as strong, as stiff. If judged by these properties alone, they are in no way inferior to white oaks; but the fact remains that the latter will hold liquids better than the former, and there is a reason for it.

The oaks are very porous woods. The pores usually run lengthwise, up and down the tree. They are clearly visible in the end of a stick, whether white oak or red oak; and one wood has about as many as the other, and their average sizes are about the same. Apparently, therefore, one oak has no advantage over the other in the number and size of pores. Neither has one any advantage over the other in the length of these pores or little tubes; for they generally are several feet long, and some of them probably extend nearly the whole length of the tree trunk.

Take a piece of red oak several inches long and smoke may be blown through it lengthwise. It cannot be done with a piece of white oak of similar length. Here, for the first time, is a difference found between white and red oak, and the cause of that difference explains why one makes good staves and the other does not.

Examine a piece of red oak under a magnifying glass, and look down into the pores; or split them open with a sharp knife and examine them lengthwise. They will be found open from end to end, if the ends can be found. They are hollow tubes, many of them as large as pin holes. They can be examined without a glass, but much better when magnified.

In the same way examine a piece of white oak. You cannot look very far down into the pores, for they are plugged with a white substance resembling froth. They may be split with a knife and examined lengthwise, but they will be found packed with the white froth-like substance their whole length. There lies the secret of the white oak's ability to hold liquids. The pores and cavities of the wood are plugged; nothing can pass through. Red oak is like a filter; white oak resembles a solid substance.

Tylosis, Product of Tree Growth

The substance which plugs the pores of white oak is known in books as tylosis. It is a product of tree growth, the food on which trees live. It is manufactured by the leaves and is sent down the trunk and all through the wood, where it is stored against time of need. It is accumulated abundantly during the growing season, and the tree uses it during the non-growing period. It is simply a reserve supply of tree food, and it is tucked away in little cells, dispersed all through the wood, to be ready when wanted. It is this stuff that gets into the pores of white oak and stops them up.

Tyloses are not often found in sapwood, but in heartwood. The sap of white oak may be as open as

red oak; but when sapwood changes to heartwood, as it does in course of time, the pores become inactive, dead, empty vessels, and it is then that the reserve food supply takes possession of them, and packs them full. The substance pushes in through the walls of the pores, and accumulates inside until the cavities are packed full. The reason the pores of sapwood are not also plugged with it is that they are already full of water and other matter, and there is no room for outside substance to get in. Occasionally, however, tyloses do occur in sapwood, but they are unusual.

It may be asked why the pores of red oak are not plugged with tylosis the same as white oak. The substance is present in red oak, and apparently as abundant as in white oak, but it does not succeed in getting into the pores. Why not? Its exclusion is believed to be due to the fact that the vessel walls of red oak are thicker than those of white oak, and successfully prevent the intrusion of outside matter.

The deposit of tylosis in pores is not peculiar to white oak. It occurs with many woods. It is characteristic of at least one of the red oaks, a scrubby tree known as black jack (Quercus marilandica). If that tree were larger it would probably be valuable for tight cooperage, but it is too small to attract the stave maker.

The best of white oak is not absolutely impervious to alcohol. It is an exceedingly insinuating substance and penetrates the minute cavities of a wood as dense as white oak, though no large quantity of it works its way entirely through the stave. It saturates the wood, and when the barrel is emptied, all the alcohol does not come out that was put in. Sometimes barrels thus saturated are put through a hot steam process to drive the alcohol out of the wood, and the spirits thus recovered are of very high grade.

Experience Teaches

The fact that certain oaks are suitable for tight cooperage and others are not has been learned solely by experience, and it has taken a couple hundred years to do it. No man went about with a microscope in early days examining wood to see whether it had open or closed pores; but if a wood looked good it was tried, and if the trial was successful, the wood won its way as a stave material. Doubtless many costly failures could have been anticipated and prevented, if stave makers in early days had known how to detect the desirable qualities. It was not so long ago that an enterprising man in California conceived the idea of making a fortune by manufacturing tight cooperage staves from some of the fine looking oaks found there. Tight cooperage staves are scarce in that state and the price is high. He made a large number of staves before it occurred to him to see if the barrels would hold. They leak like sieves. Had he used a pocket lens and examined the pores in the wood, he could have seen at once that they were wide open and the oak was an impossibility as tight cooperage material. There is no telling how many experiments like that have been made in different parts of this country, and at various times; but most of the woods have now been tried out for stave making, and manufacturers know pretty well which are suitable for tight cooperage and which are not.

If an important discovery is to be made, it will likely be along the line of some cheap and effective method of plugging the pores of red oaks and other woods to make them proof against leakage. That would open a vast source of supply for tight cooperage.—Barrel and Box.

The Manufacture of Sawdust

By S. P. Eiler

IN one large factory, very favorably situated for the sale of sawdust for butchers' and merchants' use, the demand for sawdust greatly exceeded the supply. On the other hand, shavings were a drug on the market, and were burned under the boilers or hauled out on the dump. Some little experimenting was necessary to increase the supply, for sawdust was bringing very attractive prices.

The solving of this problem was finally accomplished by the millwright, who had been doing a little tinkering on the shavings exhaust head. Based on the idea that in separating the shavings from the air in the exhaust head, the larger and heavier ones would spiral down at a steeper slant than the fine material, he did a little drilling in the shavings exhaust head with a ¼-in. drill bit.

Working around and below the shavings inlet pipe as far as he thought the fine material would sink in that distance, he drilled until he struck the right spot. At the first holes there was a current of air, but no shavings, but on going down some 6-in. farther he struck a place where a chip would catch and hang in the hole until another came along and knocked it out. On going back into this narrow 6-in. zone, he found that small chips and sawdust would follow one another through the hole in a steady stream.

By drilling between ninety and 100 holes in this small zone, and covering them with a hood, practically all the fine material from the shavings system was led down to a separate compartment of the shavings house. In this separate compartment was a flexible suction spout connected with the regular sawdust collector system. One man could easily feed this material into the sawdust system as fast as it could be shoveled from the sawdust bins at the other end.

This material was slightly more irregular than sawdust, but answered every purpose just as well, and could not be readily distinguished from the real thing.

Venerable English Woodwork

THE old English carpenters used good woods and they did their work well. When they built a house they constructed it to last. This is called to mind now and then when historic buildings in England are examined. One of the latest to be brought to public notice is an old house which has stood more than 700 years near Hereford, England, and known in English local history as Rotherwas Mansion. The paneling and other interior woodwork consist of oak, sycamore, acacia and yew. There were twelve rooms finished in that way, and a comparatively large amount of wood was required, since veneers and thin boards were not fashionable when that house was built. Everything was solid and massive. One of the rooms was once a bed chamber in which James I. slept in 1618.

Collectors of antiques in England are expressing concern just now because of the announcement that the woodwork is to be stripped from the interior of the mansion and offered for sale at auction. It is believed that some of it, perhaps all of it, will be bought by wealthy Americans, and that English museums will miss a valuable collection of panels, posts, capitals, and other ornaments and carvings which bear the stamp of antiquity.

Cost System for the Box Factory

WE have found that all the experts, at least all we read, agree that there are three cost elements to find, that of raw material, labor and expense. They all also agree as to the method of finding the first two. Whatever difference in theory there is shows itself in the method of apportioning expense, which might include anything not directly chargeable to a particular order, supervision, interest, depreciation, taxes, etc. As shown later, we adopt the so-called percentage of wages system.

In most manufacturing processes it is a simple matter to take a given quantity of raw material destined to be involved into a finished product and charge the labor of the different steps to it directly, leaving as the main problem the apportionment of overhead expenses. The box business seems to be somewhat more complicated.

Fig. 1.

Order No.	Name		Date
Hours	**Rate**	**Cost**	**OPERATION**
			Fitting
			Resawing
			Printing
			Nailing
			Brading
			Handholing
			Cleats
			Pony Planer
			Bundling

½	7	½	8	½	9	½	10	½	11	½	12
1	½	2	½	3	½	4	½	5	½	6	

CONWAY LUMBER CO. BOX DEPT.

Foreman..............................

To get our raw material we tally all lumber into the mill and charge it up against the particular order.

Our box business is not of enormous proportions, nor is it complex, We manufacture shooks, almost entirely, for shipment in carload lots, anything from a canning case to a dry goods box, but all shooks. We use round edge lumber entirely.

On analysis, it appeared that every board used was handled by the yard crew, was planed, was cut up by the swing saw men, was fitted, was matched and was trimmed. Every bit of our output, with almost no exception, passed through these stages, and the same crew handled it all. We realized that the fitting was the key to the progress of an order through the mill. Some orders naturally cost more per thousand feet for fitting, and likewise in proportion for all the other processes mentioned above. Theoretically, it costs the same to handle any 1,000 ft. of lumber as it does another thousand, and the same may be said of planing, though possibly there might be a variation according to width and length. Actually, however, if it takes longer to cut up and fit the lumber for a given order, it costs more to plane it because there is the same crew getting in their time and if they are able to go ahead and loaf what shall we charge their time to but the order they are then working on.

Nice Point to Worry Over

Cost accounts will find that a nice little point to worry over, but we are satisfied under our conditions to charge the labor, yard, planer, cutting, matching and clipping proportionately to cost of fitting. Consequently we have our fitters make out time slips showing time spent on each order daily. See Fig. 1. The foreman, who also keeps the time, has his time book divided into four groups as follows:

1. Fitting.
2. Yard, planer, cutting, matching, clipping.
3. Resawing, etc., anything charged direct.
4. Overhead.

Fig. B.

Order No.	Name		Date
QUANTITY	**DESCRIPTION**	**PRICE**	**AMOUNT**

Foreman...............................

Conway Lumber Co.—Material Delivered

From this a daily labor slip is made up, showing cost of each group.

The cost of labor fitting a certain order: (is to) the whole cost of fitting for the day: (as) (x) the cost of 2 for that order: (is to) the total of group 2 for the day. Find x.

Fig. C.

CONWAY LUMBER COMPANY

Box Shop Overrun Tally **Order No.......**

Box. No.	T. & B.	Sides	Ends	Cleats	

Total Feet.......... **Foreman.....................**

This amount is entered daily as Labor No. 1 on the back of the card shown in Fig. 2, and filed in a drawer. The labor resawing and nailing and miscellaneous productive, such as stapling, hand-holing,

Fig. A.

STRIPPERS TALLY.

Customer's Order No. .... Our Order No. ....

Date in. .... Time out ....

Destination .... Date out .... Time out ....

		L	W	D		1 Part Bd. Meas.									
No. A															
T B															
S															
E															
Cl															
Cl															
No. B															
T B															
S															
E															
Cl															
Cl															
No. C															
T B															
S															
E															
Cl															
Cl															

Fig. 2.

FRONT VIEW OF CARD.

Customer		Order No.		
Lumber		Quantity plus 10%		
Shop Order No.	Begun	Finished		
	COST			
Lumber at per M,				
1. Labor through trimming		per M		
2. Labor Resawing		per M		
3. Labor Miscell.		per M		
4. Labor Overhead		per M		
Other material				
Expenses	% wages			
		Total cost		
		Total cost per M		

BACK VIEW OF CARD.

Labor 1			Labor 2			Labor 3			Labor 4			
Date	Hours	Amount	Date	Hours	Amount	Date	Hours	Amount	Date	Hours	Amount	No. Feet

COST SYSTEM FOR THE BOX FACTORY

bundling, mitering, etc., are all obtained from slips (See Fig. 1) made out by the workmen, and entered in the proper place on the back of the card daily.

Group 4, overhead, in the time book includes fireman, watchman, filer, foreman, edgings men, etc., all properly chargeable to every order, which we do proportionately to the cost of the direct labor on the order.

We also take care of office expense and overhead fixed charges in the same way.

Get Out Monthly Statement

We get out a monthly statement (for other reasons) which naturally makes it easy for us to keep the proper percentage of labor to charge off for overhead expense.

Miscellaneous labor is charged daily; overhead expense when the order is completed.

Were our product more diversified, or our business on a very much larger scale and our resaw and nailing machines in less constant use and representing a larger investment we should feel justified in adopting the "production centres" idea, dividing up the factory into smaller units, say the first to include planers and everything up to and including clippers, a second taking in the resaw, and a third the nailing machines, distributing the overhead charges in this way by means of a machine rate.

For our purposes, however, we feel that the above outlined plan is accurate enough.

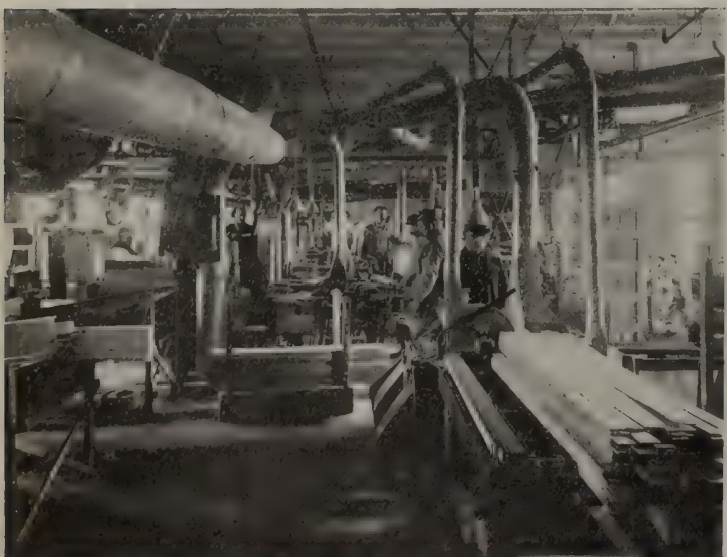
For the benefit of any who might be interested, we show the various forms used in our system.

Fig. A is our production order, which is made out in triplicate, one going to the trimmers and one to the shipper.

Fig. B shows the material slip used to charge up special material against an order.

Fig. C is an overrun tally used by the foreman when more stuff is gotten out on an order than shown on the invoice, manufactured stuff stored.

As stated above, ours is a small box business. It has the proportions of the proverbial small man's plant which can be under the watchful eye of the proprietor,



Where the work is highly specialized, special planer rooms are generally found. The illustrations on this page show an overhead blower system. A blower system in a woodworking mill makes better work possible

Exhaust of blower pipes in boiler room. Sawdust and chips delivered right to boilers

And ours has been under a watchful eye, but that eye necessarily has been a guessing one, and it is surprising the number of times it has guessed wrong in view of the facts as brought out since the establishment of our cost system. It is the difference between thinking and knowing, between scientific management and the reverse. It discovers losses and inefficiencies, and points the way to the remedy. It has been successful because the person in charge of it is intimately acquainted with the business and follows it up, a necessity for the success of any system.—Packages.

A Lesson From Chicago

THE illustrations reproduced on this page are from photos taken in a woodworking mill at Chicago, which started its first plant in a particularly bad period when general business was considerably depressed. But the manager had the wise idea that the way to succeed is to go out and **get** business, and then take good care of the work. He got a few window frames to build at a low price, picked out some extra good stock and went to it. When they were done, instead of arriving on the job with the edges of the mouldings ragged from tool "burrs," they were smooth, because a mill-hand had gone all over them with sandpaper. A nicer, cleaner-looking lot of frames you never saw,—almost too good to paint. "Who did that work?" asked the architect, "that's as fine a lot of frames as ever I saw."

Well, the contractor immediately let his interior millwork to the same concern, and a pretty load of trim it proved to be—every piece of stock fine and clear, and every moulding clean-cut and slick as though it were cast in metal. It cost a little more to make, probably, but not much—simply more caution on the part of the men.

Now this mill has one of the largest woodworking plants in the state—and it is well equipped, too, with a blower system to chute chips and shavings from the machines right into the furnaces — which is one of the ways up-to-date mills keep their work up to the right mark. Several prominent Chicago architects will not allow contractors to sublet woodwork to any other mill but this one, and this means good prices and plenty of work the year round.

Graining in Imitation of Mahogany

English Practice as Described by a London Contemporary—Mixing and Application of the Colors—Treatment of a Door—Finishing

THE following article descriptive of the method of graining a door in imitation of mahogany represents English practice and is taken from a late issue of one of our London wood-working contemporaries.

In the first place the ground color can be prepared by mixing equal parts of yellow ochre and orange chrome yellow, and adding one-fourth part of bright venetian red. To get the brighter color the yellow ochre may be omitted and half the quantity of white base substituted. The color should be thinned with one part raw linseed oil to three parts of turpentine and sufficient liquid driers to dry the color in from 12 to 15 hours. When the door has been thoroughly sand-papered and dusted the first coat of color is applied. After an interval of at least three or four days the second coat is applied, and when thoroughly dry the graining is done. This portion of the work may be done wholly in water color, or by being done partially in water color, and it may be finished in oil color.

The graining colors are burnt sienna, vandyke brown and rose lake or rose pink. For a very bright shade crimson lake may be used in the overgraining color.

Vandyke brown alone ground in water is used for the water color stippling, when the work is to be finished in oil color. The vehicle for applying the color is one part stale beer or vinegar to two parts clean water. The color is applied in a thin wash and while wet is stippled or flogged with the long bristle made for that purpose. The object desired is to endeavor to produce the effect of the dark pores of the wood.

When dry the oil color is applied over the stippling The color is made by mixing equal parts of burnt sienna, vandyke brown and rose pink. Thin this color with a mixture composed of one part raw linseed oil to two parts turpentine, adding a sufficient quantity of driers. Make the color thin and apply with a soft brush evenly over the graining color and thicken it with some of the rose pink and vandyke brown, and with a small fitch tool make the dark veins in the wood. Draw the dry rubbing-in brush first lengthwise with the grains and when the color is leveled or smoothed blend lightly crosswise, but always in one direction. This will produce an effect similar to that seen in the natural wood. A badger blender may be used instead of the rubbing-in brush. One edge of the darker veins is invariably darker than the other and seems to recede into the wood.

Study the grains of the wood and notice all the lights and shades and endeavor to reproduce their counterparts in the work. When dry the oil color may be overgrained in oil, using a thin wash of the graining color. Or the crimson lake may be used alone, reduced to a very thin wash with the thinners previously mentioned, or with a mixture of liquid drier one part to two parts turpentine. When thoroughly dry this may be varnished.

Where the work is done wholly in water colors the graining color is composed of the same proportions of pigments, and they may be mixed together or used separately and a dip of each applied and blended on the work. The latter method is most frequently pursued by trade grainers if the work is not of very large size.

The work is first damped over with a sponge wrung out of some stale beer or vinegar. The color is then applied sparingly and worked up with the mottler, sponge and blender to produce the effect of light and shade in the wood. This process cannot be described with accuracy. Nothing but a study of the real wood and a careful attempt to reproduce similar effects can afford an idea of how it is done. The darker, finer grains (which usually run in the general direction of the heart grains of the wood) are represented by using a thin overgrainer charged with dark color and applied over the dry water color, and blended at once to produce a sharp, clean edge on one side of the work. When this is dry it may again be overgrained, using thinner color, and when all is dry the hand can be passed lightly over the color to remove any surplus dry color as previously described. A very thin wash is all that is necessary for this overgraining, as the thicker color obscures the sharpness of the work done in water color.

When dry the work can be varnished or it may be finished in oil, using two parts raw linseed oil to one part turpentine, adding sufficient liquid drier.

The Thinnest Veneer

THE thinnest veneer made in commercial quantities and in a general commercial way is the veneer made from Spanish cedar into stock for veneering cigar boxes. There are used in this country approximately 5,000,000 feet of Spanish cedar annually for the making of cigar box lumber and cigar box veneer. Approximately 500,000 feet of this is cut into veneer of which it takes 100 sheets to measure an inch in thickness. Some of it is cut so thin that it takes 110 sheets to make an inch in thickness. Here is an interesting problem for those who like to figure out things, to take a pencil and figure out how many feet, surface measure, of veneer cut in this thickness with a rotary machine can be made out of 500,000 feet log measure of Spanish cedar.

Even what is called the thicker cigar box lumber is as thin as the average thickness in veneer. About a million feet of Spanish cedar per year is cut into ½ inch in thickness and between ¼ and ½ a million is cut 3-16. These are the standard thicknesses for cigar box lumber, taking the industry as a whole. When it comes down to the real thin stock this is getting it down pretty fine and this thin stock in veneer cut 100 to 110 to the inch is used for covering poplar and gum cigar box lumber so as to make it have the appearance and some of the aroma of Spanish cedar. The finished stock then is about ⅛ to 3-16 in thickness. No big hydraulic presses are used for this veneering either. The veneer is simply spread and brushed out and the stock piled up one on top of the other to dry.

A Treatise on Moulding Knife Design

By N. J. Millette

We find to-day that science is making great developments in all branches of the industrial world. Every motion is depicted, timed and figured under special classification and carried out through the various processes in simple units, so that they can be understood and mastered by mechanics who have a moderate knowledge of mathematics.

Most intricate combinations are rendered simple and practical by means of a tool, a chart, an instrument or a test gauge, so that clear and simple readings can be made by the working man, thus reducing the worry and increasing the efficiency of the industrial world.

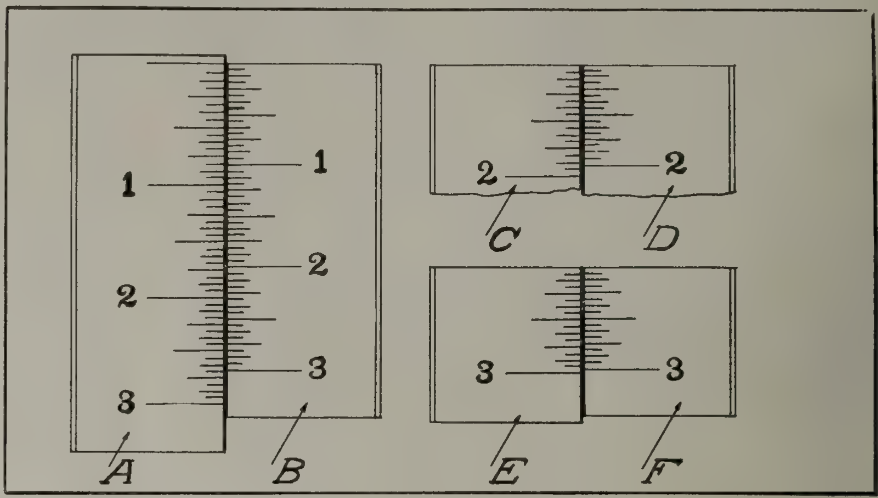


Fig. 2

Calculations are simplified by the use of a "slide rule." The difficult problems of making suitable allowance for shrinkage on a pattern for different metals, are solved to a nicety by the use of a "shrink rule," etc. An indefinite number of other mathematical problems are solved without the least effort of brains and become simple labor.

In many operations of the woodworking line, we rest on the oars and stick to the old methods of "guess work." We know it is not right, but we believe that it is not worth while to change for a better way, as if the woodworking business was going to stop in the early future.

It is never too late to get busy and attempt to master difficult problems, especially those where "guess work" has been used, and eliminate from our ways of doing things, all methods that are not practical and known to be mechanically correct.

My intention in writing this treatise is to give those interested a method of constructing a special scale which may be used to measure dimensions of mouldings on the cutter line, or, in other words, to furnish a scale that will read on the knife measures, what a rule will read on the finished mouldings, and to explain the way to make use of this scale in setting moulders with combination cutters or in designing cutters for special shape mouldings.

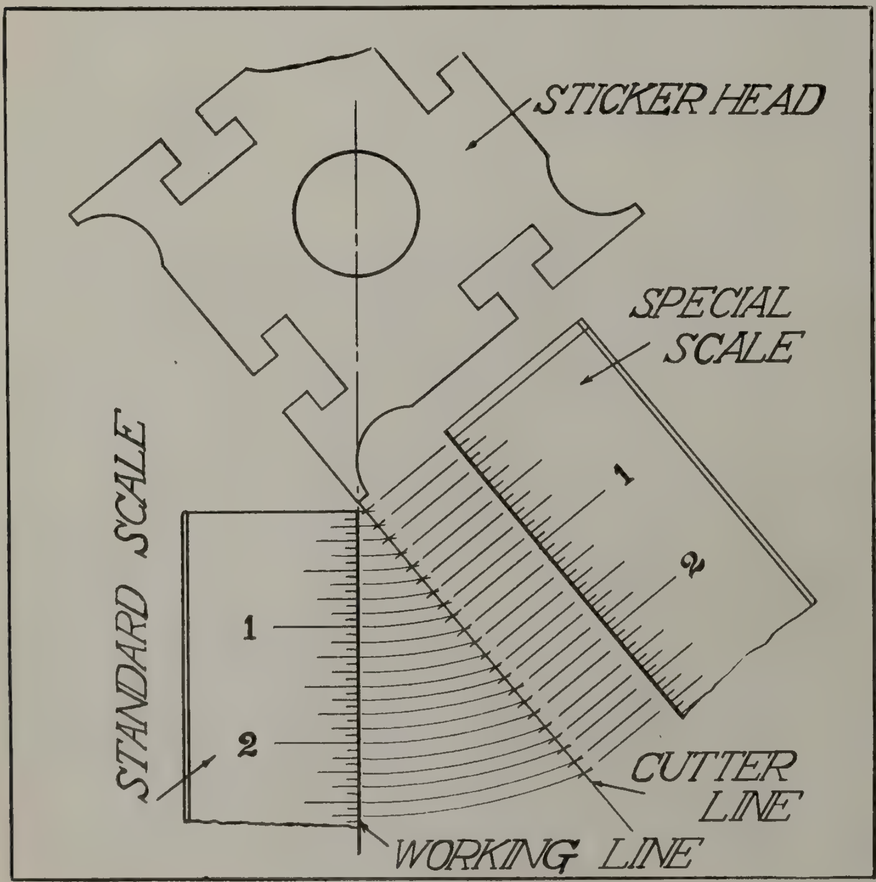


Fig. 1

We find that heads not carrying cutters at the same angle require a different shape cutter to produce a duplicate moulding. Although a slight variation in the angle may not make enough difference to be very perceptible, the difference exists, and it is advisable to have a scale made to use with each machine, unless the shapes of heads are found identical.

Fig. 1

Fig. 1 shows the lay-out of a sticker head, and the method of designing the scale. To construct this figure, make the outlines of the head, by tracing around the end, or designing from dimensions, laying it out in such a way that one corner of the head will be perpendicular to the center of the shaft. From these points draw a vertical line which will represent the working line of the moulding feeding horizontally.

Along the working line, at the left side, is designed the standard scale or graduations of the rule. (English measure). At the distance allowed as clearance over the corner of the head, as represented in the figure. This clearance may be altered to suit the projection adopted by the operator.

Then following the surface of the head, where the cutters are bolted, draw a straight line long enough to

clear the length of the scale desired. This line is termed "cutter line." Now, all the graduations of the "standard scale" are transferred to the cutter line by using the center point of the shaft for a center, using a compass.

We find at these divisions as they increase in distance from the center, gradually decrease in length on the cutter line. From this point, we have an illustration of the extended shape of the cutters over the shape of the moulding.

The "special scale" is designed parallel to the cutter line using the intersection points as stated. Using this same principle with different shaped heads we find that the graduations on the special scale will vary in size, showing that a scale made for a certain shaped head could not be used to advantage for another.

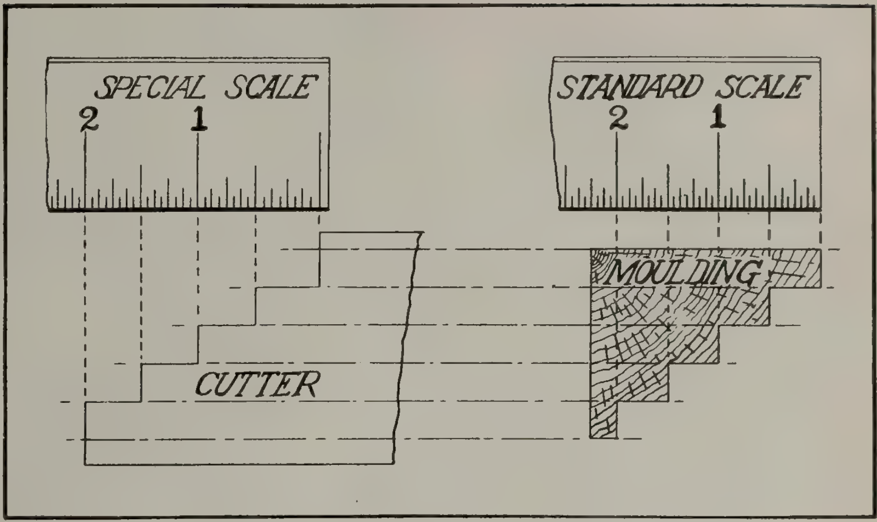


Fig. 3

Fig. 2

Fig. 2 illustrates a comparison of the scale made as above stated. "A" represents the special scale; "B" the standard. Note the difference between the two scales and particularly in the first inch of the length. "C," in the second inch of the scale "A," placed opposite the second inch of standard scale, shows less variation and difference. We find by referring to "E" and "F" that very small difference exists between the two scales at that projection, and it decreases as they extend from the centre.

Fig. 3

Fig. 3 shows how straight work can be laid out, using the scale, if we desire to make a piece of straight work, in steps of one-half inch in succession divided as represented by "moulding." Lines drawn from the standard scale at desired size and squared-off on both ways will determine the shape of the stock.

To get the shape of the cutter, we proceed as follows: As the proportions across the cutter are equal to the reverse shape of the moulding, parallel straight lines are extended to the cutter shape, allowing extra width on sides for clearing edges. To determine the length of cutter, the special scale is used in the same way as the standard scale is for the moulding. The same construction can be made direct on the head by using sectional cutters measured in place with the special scale.

Fig 4

In making a moulded form, we proceed in the same way as for straight work, carrying every straight point making as many intersections along the curves to get the proper shape, as illustrated in Fig. 4. Moulded combinations are measured direct on the head the same way as if straight work and with a little practice, a person in short time will be able to set any shape of moulding by placing his cutters so the size required, setting accurately at the first shot, saving considerable time and material.

Replace all guards and safety devices when through making repairs, and before machinery is started.

Some Comments on Oak Flooring

THE extent to which hardwood flooring is being used at the present time in modern residence construction lends more than usual interest to brief mention of some of the characteristics of quartered oak when used for this purpose. In quarter sawing oak, that is, in sawing from the heart to the sap across the rings of growth, there is brought out that beautiful figure known in connection with cabinet work as the "splash line." Sometimes it is very conspicuous and at other times it is more subdued, yet always attractive and takes a high polish. Moreover, flooring with the quartered face presented not only polishes easily but is more durable and therefore gives better service. The point is made that quartered lumber of any kind has less tendency to swell and shrink and quartered oak is no exception. There is a slight shrinkage in quartered oak in width in its primary drying, but after it is once thoroughly dry the variation in dimensions due to atmospheric changes is very slight. The little swelling there is tends to affect the thickness of the wood more than it does the width, and therefore flooring made from quartered oak carefully matched and laid closely together tends to result in a very satisfactory piece of work.

Quartered oak flooring is made in the same general

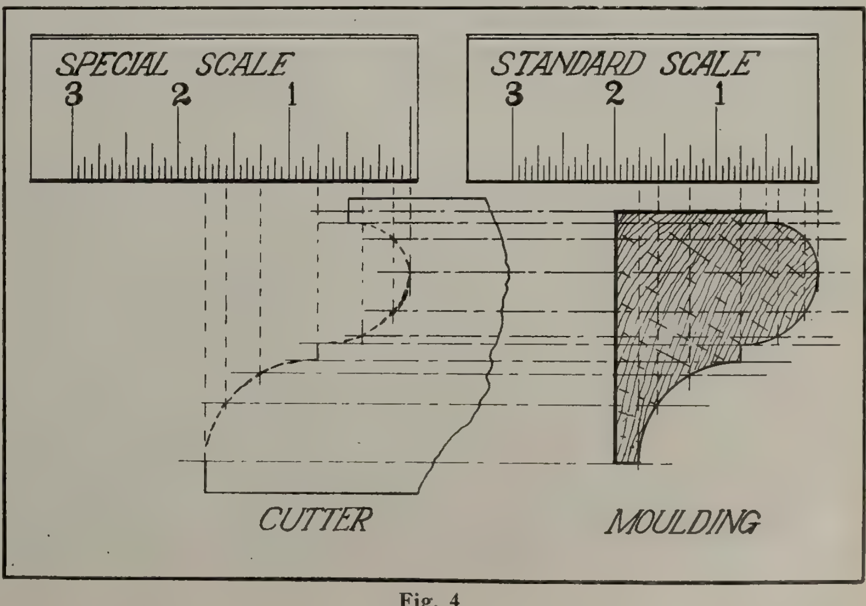


Fig. 4

widths as plain oak and by leading makers of oak flooring in two general thicknesses—the standard 13-16 in. and the thin stock ⅜ in. The former can either be laid on or without a sub-floor, depending on whether or not one intends to lay in border or paving effects. Where just a plain field is involved the 13-16 in. quartered oak can be laid directly on the joists like any other flooring with satisfactory results, and a certain amount of border effects can be worked in it when laid in this manner. A strip of some other wood can be put in along the sides running the same way as flooring and then inlay a small strip corresponding crosswise of the ends, and in some instances other variations can be made, much depending on the method of framing and nailing the stock. If, however, it is laid on top of a sub-floor it can be placed in any form desired.

The thin or ⅜ in. stock may be laid either over old floors, taking the place of carpets without in any way interfering with or disturbing the other woodwork of a room, or it may be laid in a new building over a sub-floor. It too is matched and end matched so that it can be blind or secret nailed, and it can be laid straight just like heavy flooring and can be worked into border effects and paved in or made into any shape desired.

Peculiarities and Profitable Properties of Glue

THE following observations on glue—its treatment, manufacture and application, are extracted from an interesting publication issued by a Chicago manufacturing concern. The notes are well worth the careful perusal of every practical man in the woodworking industry.

Odor, Storage and Grades

From the assortment of facts already afforded our inspection we have selected the following particulars. They will whet the desire for the further enlightenment that is promised. Meantime they also show in concise manner certain essentials to glue satisfaction that are well worthy of emphasis.

Odor and Glue—When the average person thinks of glue he thinks of odor, and right at the start we want to correct this idea, and "defend the smell." Glue and gelatine are nitrogenous substances procured from animal matter by the partial decomposition of hides, bones, sinews and other waste tissues through the agency of water and heat.

The lesson we wish to drive home is that these animal products, glue and gelatine, will not permit of overheating, nor of filthy conditions which favor bacterial growth. It is a matter of dollars and cents, and is deserving of study and attention. Practically all glue difficulties may be laid at the door of improper heat conditions or conditions favoring decomposition.

Keep in Dry Storage—Remember, glue will keep perfectly for many years, as long as it is dry. It is in a wet or damp state that bacterial action begins; so don't cook glue until ready to use, expecting to hold it in jelly form.

Grades of Glue—Both glue and gelatine are manufactured from animal tissues, principally bones, hides and sinews. Generally speaking, the weaker and cheaper grades are made from bone stock and the better qualities from hide stock.

Glue Choice and Treatment

However, some bone glues cost considerably more than some hide glues, and furthermore are far better for certain kinds of work. The better bone glues are less viscous than the hide glues and are more desirable for certain classes of veneer work; also for joint work on some of the more dense woods, especially in combination with hide glues.

Fit Glue to Work—Each class of business requires glue with qualities differing from those demanded by some other manufacturer in the same line.

This state of affairs makes the glue problem extremely complicated, and it is necessary that the user take the glue manufacturer into his confidence and avail himself of every opportunity to study conditions so he may meet them with the proper grade for the work. A doctor could not administer to a patient unless he were allowed to first diagnose the case.

There are two methods of dissolving glue or gelatine.

The Soak-First Method—First, by soaking in cold water from one to eight or ten hours and then putting in a double cooker and bringing to a slow heat; do not let the temperature rise to above 140 degrees Fahr.

If it dissolves at a lower temperature, there is no need of allowing it to get hotter. Any temperature up around 125 degrees Fahr. is sufficiently hot for application to the work. There has been a general idea among glue users that the hotter the glue the better the bond. The only aid hot glue is to good work is that it is thin and more penetrating; also the more heat there is (either in the glue or the stock), the longer it will be before the glue chills and becomes unworkable.

However, high temperatures spoil glue, a momentary rise of temperature up in the neighborhood of 190 degrees Fahr. in some instances destroying fully 25 per cent. of the strength of the glue. The longer the high heat is maintained the greater the damage. A day's cooking of glue at the "safe" point of 140 degrees Fahr. is liable to injure it to the extent of 50 per cent.

So be sure and not allow the men to hold dissolved glue from one day to the next. It is even better to dissolve twice a day. Some users secure better results on hardwood with an 8c glue than others using a 14c grade. It is all in the handling.

Don't soak the glue too long. The length of time depends on the form of the glue; that is, thin-cut or thick-cut flake, whole sheet, ribbon, or ground glue. In the case of sheet glues, break the pieces before putting to soak. This can be done without waste by placing in a bag and pounding.

The smaller the particles the quicker will they soak thoroughly. Take whatever style of glue you are using and determine how long it takes to thoroughly soak. If it is ground try some of the largest particles and find out if you can mash them between the fingers.

Be sure and determine that the centers of the particles are not hard (unsoaked). In the case of flake or sheet glues, after the glue has been soaking for some time, take one of the thicker pieces and cut with a knife to determine if the centers have softened up. As soon as the entire piece has softened the glue is ready for the cooker.

The Dry-Cooking Method—The second method of dissolving glue is to add ground glue or thin flakes to

the hot water in your double cooker (bear in mind above instructions in regard to temperatures) and subject to **constant** stirring, not occasional stirring. This method of dissolving is more practical where large quantities of glue are used and a power agitator can be afforded.

Differences in Dissolving Glue

If the glue under this process of dissolving is not kept in constant and vigorous agitation, a gummy coating will form around the outside of each particle or flake, which will prevent the dry glue within from dissolving. Of course the glue liquor already formed will not be of the proper consistency or strength for working and accordingly the entire pot of glue will have to be kept hot for a longer period than under the "soak-first" method.

However, one objectionable feature of the "soak-first" method might tend to off-set the greater length of time required to cook by the "dry-cooking" method. This feature is that while the glue is soaking, especially in warm weather, bacterial action will detract somewhat from the strength of the glue.

Of course, as soon as the soaked glue is put into the double cooker and brought to the required heat the bacteria will be destroyed, but whatever harm they have done to the glue while soaking cannot be rectified. We think the "soak-first" method the more practical for the average factory. In employing the "dry-cooking" method let the water in the cooker come to a temperature of from 80 to 90 degrees Fahr. before adding the dry glue.

The Equipment and Evaporation

With either method of reducing glue, be sure and equip your men with up-to-date cookers, soaking pails, etc. Iron equipment of any sort is bad when the iron comes in contact with the glue, as iron rusts, and rust is very harmful to the quality of glue. Rust also discolors the liquor.

Evaporation—Do not dissolve any glue, nor keep it hot for use, with the top of the cooker open. All pots should be equipped with covers to reduce as much as possible evaporation. Evaporation destroys the required proportion or balance of water and glue, upsetting the spreading, setting and drying qualities, and making it necessary to add more water. When water is added after the glue is once dissolved there is no way of knowing how much to add, and the proper strength in the liquid cannot be maintained. The oftener the glue is thinned the more liability of destroying the proportion.

Steam, Cleanliness and Setting

Protect from Steam—Admit no steam to the glue, even preventing it from coming in contact with the surface of the glue in the pots, as steam contains acids from the boiler compounds, also rust and pipe grease, any of which weakens the glue and discolors it, the acids sometimes turning a pot of good glue black. Speaking of glue turning black, green wood, containing tannic acid, can also turn glue black in the joints. The only other cause we know of for turning black is from decomposition, the acids generated by the bacteria as organic waste affecting the glutin.

Clean Pots Daily—Gluepots and cooker should be cleaned thoroughly, inside and outside, each day. A little spoiled glue left on the side of the pot or cooker, from the previous day, might spoil the entire contents.

Pure Soft Water—Always use clean soft water for dissolving and thinning glue or gelatine. Never use water from the boilers or glue cookers.

Foaming—Speaking of the paper-box manufacturer, he often has trouble with glue foaming. This may be overcome by the addition of a little oil to the liquid glue—sweet oil, vaseline, or even machine oil. However, the company manufactures acid-free glues that are guaranteed not to foam, froth or scum. Overheating glue also causes it to foam.

Heating Stock—The materials to be joined should be heated, especially in cold weather. First, to drive moisture from the pores of the stock so glue may penetrate and bond properly; and second, so hot glue when applied will not chill and lose its effectiveness. If the stock is cold the glue when applied is chilled, and thickens up, so the parts to be joined cannot be brought in close contact, which is necessary for good glue work.

Clean Stock—Remove all dust and particles of every sort from the parts to be glued; the pores must be open so as to permit of the glue penetrating and getting a good hold on the surfaces. If the parts to be united are greasy, be sure to remove the grease with weak lime water or a similar solution.

Drafts of Air—Avoid drafts in the shop where glue is being used, as the stock is liable to be chilled, causing the glue to set sometimes too quickly, but of most importance, to dry unevenly, and as in cases like laying veneers, the stock will warp and a perfect bond is impossible.

Keep Factory Warm—The quicker the glue cools or chills after being applied to the work the earlier must the glued pieces be put in the presses. As a usual thing it is best not to build stacks (as in the case of veneer work) that require more than five or six minutes to build, as the first pieces glued may chill too much before going to the press to allow a good contact and the bond becoming established.

Setting Qualities—Similarly, in factories where quick setting of the glue is desirable, and provided your glue manufacturer cannot furnish you with a quick-setting glue, it is well to pay attention to temperature, keeping the room as cool as possible, which will cause the glue to set more quickly. In this connection, the Clarkson Glue Company has had paper-box people tell it that a glue can be made to set more rapidly by adding a small proportion of turpentine to the liquid glue. If this is effective it could be used in other lines of business than the manufacturer of paper boxes.

To Make Glue Flexible—Similarly, if a glue is too brittle, the addition of a small proportion of glycerine to the glue will render it more flexible after drying. This is a good point for emery and sand-belt users to bear in mind.

Messrs. Graves Bigwood & Company, manufacturers of pine and hemlock lumber, whose mills are at Byng Inlet, reporting to the Canadian Woodworker, state that business is of a reasonable volume with satisfactory progress to date. The company are particularly concerned just now with the reconstruction of their Byng Inlet mills which were burned last year and work on which is progressing satisfactorily. The mill is to be equipped with the latest manufacturing devices and will be one of the most modern of its kind extant.

A syndicate has been formed in Kingston to erect, during the year, fifty houses to rent at from $10 to $12 a month. They thus hope to meet the demand of workingmen for cheaper abodes.

Dimension Stuff

By J. Crow Taylor

IF you have a saw driven by power, either out on the job or in the shop, that bucks and balks, pinches and cuts up instead of slipping through its work smoothly and easily, as a good saw should, just stop and think about it a minute before you start in condemning things. Think of this saw just as you do of your hand saws, when they get going bad, for the same principles apply to both. When your hand saw runs heavy and cuts slow, you know it's dull and needs the file; when it dogs and pinches, you understand readily that it is time to get busy with the set, and when it chatters in the cut, dancing all around, but not making much headway through, you know it has too much set.

Well, the same reasoning applies to the power driven saw. Like the hand saw, sometimes when it is pulling hard a bit of oil will help along, and always when it gives trouble, or fails to give satisfaction, you can reason out and correct the trouble on practically the same lines as the hand saw. Get the whole thing in this light once and the power saw will not give you much trouble to keep it in the right shape for satisfactory work.

When to Cull Out Lumber

If lumber comes onto a job not up to the grade your order calls for, the time to cull it out and lay it aside is before you do any work on it. Mistakes on this point lead to loss of standing when there is trouble that goes into court. There is a case in mind that illustrates. The builder had a lot of joists on the job that were off grade. But he cut them to length and shape, and had put some of them in the building when the architect came along, made him take the defective ones out, and condemned a lot that were cut but had not yet been put in. The builder sent for the lumber yard man, and then the yard man sent for the representative of the mill that had shipped the lumber. The mill man admitted that part of the stock was off grade, and they had a right to cull it out, but he made the point that it should have been culled out sooner, and that the cutting of it to shape constituted in the eyes of the law, acceptance of it. He was right, technically, too, and it is well to keep this in mind, and to go through your lumber and pass judgment on it before cutting, even squaring to length.

Mitered Casing (Jambs in Two Pieces)

Mitred casing on the inside of doors and windows makes a neat job, especially when it is a hardwood trim, and it looks like an easier proposition than the regulation heads, stools and plynth blocks. But it is not, for mitering calls for nice joinery, and when the casing has to be fitted against plastering that is not straight—which is no unusual thing—it is almost impossible, unless one first does considerable work at straightening up the plaster face all around the opening.

Some of the neatest work of this kind the writer has seen lately was done in the shop, the casing being put on all the interior jambs before they were put up. This is done by making the jamb in two widths, joined together in the center with a tongue and groove, so that the jamb with the casing on it can be put in place after the plastering is all dry. This kind of a jamb, you should understand, is somewhat different from the regulation plowed jamb. It has the stop planted on afterward, and this covers the joint between the two halves so that if they do not come together snug there is really no harm done. It is the easiest and seemingly the best way to do a fine job with mitered casing. That seen by the writer was veneered mahogany jambs, solid mahogany casing, and was being put into one of the fine office buildings of the year.

Preserving the Polish of Tools

Condensation of moisture on the surface is what takes the polish off tools and makes iron rust. Preventing it is simply a matter of keeping the surface coated with some varnish, resinous or oily substance. If tools are carefully cleaned every night and then gone over with an oily rag, they should keep in very good shape; that is, if they are in use every day so that the oily coating has a frequent renewing. A heavier coating for tools that are to be put away for some time, and one that can be cleaned off readily, can be made by melting together 7 parts of tallow and 1 of resin, stirring the same till it cooks. Apply in a half liquid state, thinning to the right consistency with either benzine, gasoline or coal oil.

To Preserve Doors and Sash

When you have extra doors or sash left over from a job, or on hand from any cause, their value for use on some other job is going to depend a whole lot on how well you take care of them. If they get coated with dirt or soiled in handling, it is very difficult to make them look nice enough again for natural finish, Indeed, even the sun shining on them will take the life and brightness out of the wood. Have some sort of a clean, dark closet or bin about your shop to keep these in. That's the way the sash and door people keep them bright—in dark warehouses and dust proof bins. Also, they take pains in handling them, so as not to soil them, and when they are shipping single doors out, the careful ones cover them with paper. That is a pretty good thing for you to do, cover the surface over with paper, either pasting or gluing it to the edges, or tack a lath on the edge, drawing the paper under it. Heavy, brown paper is best, but even old newspapers will beat no covering at all. And don't let these doors stand around loose in the shop to get soiled and messed up; make it a practice to put them away right when they are brought in. It is the only way to preserve their full value and get all you should out of them.

Gluing Dowels

The right way to glue dowel pins into their holes when you are using them in joinery, is to put the glue in the holes, not on the pins. When you put glue on a pin and drive it into a tight hole, the outer edge of the hole scrapes the glue off, and it messes up the surface instead of serving the purpose for which it was intended. Where they make dowel doors in quantity they have a series of little tubes up which they force the liquid glue and over which the holes of the stock to be glued are slipped to get the glue inside. For shop work you can make a little swab brush that will go into the holes. With this in hand, turn the piece on its back, with the hole up, swab in the holes with glue, then turn over so that it will run well down toward the outer edge, then drive in your pins without any glue on them and you will get a glue job that is both clean and good.

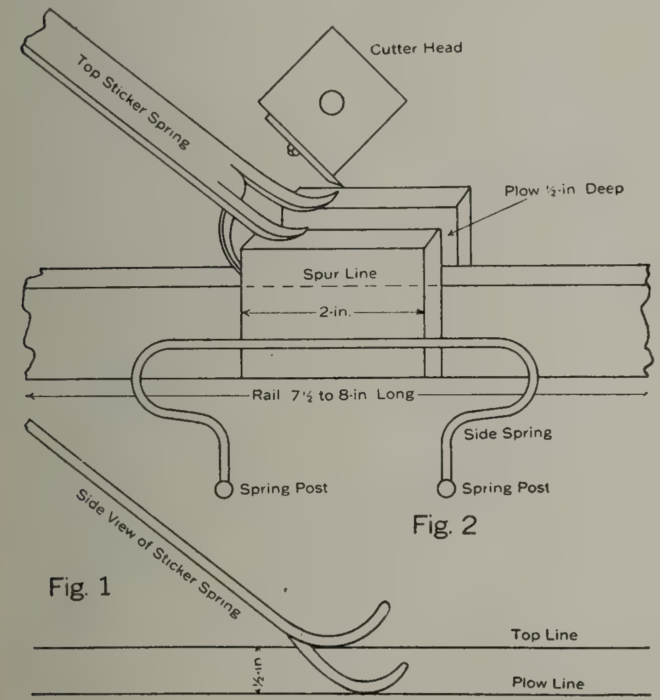
You probably think you know all that one ordinarily needs to know about how to prepare glue for use. But do you know that it is easy to spoil glue by over-

heating even if you are preparing it in a water jacketed vessel? The right temperature for what we call cooking glue is from 150 to 160 degrees F. That, if you will just stop to think for a minute, you know is considerably below the boiling point of water. To prepare glue with water at the boiling point is to kill off just about half its strength. Cooking is a misnomer for glue; it should not be cooked, but soaked gently in cold water, say over night before you use it and then when ready to use heat it to a temperature not exceeding 160 F. Also, and this is about as important as the heating, mix up only what you need for the day, because glue mixed up goes stale rapidly, and any residue left over not only loses value, but injures fresh glue that may be added next time. Clean out your glue pots and throw away any left over glue and you will have a whole lot less trouble with your glue joints.

Sticking Short Stock

By Ben Riley

ALL stickermen that do cabinet work are well aware that it is quite a task to stick short stock, says Ben Riley, in The Woodworker. Fig. 1 shows a spring that will overcome this. Take any spring you can square, 3-16 in. thick



by 1 in. wide, make two cuts with a hack saw to fit your plow, then heat and bend as per sketch.

With this spring you will have a continued bearing surface for long or short stock. It is understood that you must have a standard depth for plow, to use one spring only.

Fig. 2 shows a handy spring for short stock, and which can be used for other work as well. With this spring you have a continued bearing surface while your head is cutting. Rails should never be cut shorter than from 7½ in. to 8 in. long, regardless of what the spur line is.

Try this, and you will not have to nail strips on your rails to keep three or four in line, so they will not kick up the old way and you have to throw some of them away. You can also run bars with this spring, by using a shoe about ½ in. thick, to clear the knives.

The Bandsaw as a Crosscut

By C. Taylor

THE band-saw has made remarkable strides not only in the sawmill, and as a resaw for reducing lumber, but of late years it has been making a conspicuous place for itself as a shop and factory rip-saw. But with all of this development seemingly very little effort has been made to utilize the band-saw as a cross-cut.

There are a few isolated efforts, but in the main the principal use of the band-saw in cross-cutting is simply the incidental cutting off of the regular shop band-saw used for shop work. It is doubtful if there is an instance in the country where the band-saw has replaced the old swing cross-cut at the stock sawyer's bench or if it has even been thought of for that purpose.

Band-saw Substituting for Drag-saw

The band-saw has been used and is being used to a certain extent to perform the mission of the drag-saw, for cutting off logs. And in this work the saw blade is turned with guides so that the teeth are directed outward through a certain portion of its run and it is used for cross-cutting logs by the frame being balanced and swinging over, something like a drag-saw.

Maybe we will never develop the general use of the band-saw for cross-cutting purposes, and then again maybe we will. It depends partly on the interest manifested and partly on the ability to design special saw frames and accommodate them to the needs of the work.

Take the sawmill, for example, where there are big circular saws used in a series for slab slashing. In the South it is often the practice to set these big heavy circular saws on a line of shafting four feet apart and let the slabs pass through them on endless chains and they are thus automatically cut up into 4-foot lengths for making plastering lath.

These slab slashers are sometimes more or less troublesome and they call for very heavy saws to prevent their getting sprung and broken and it takes quite a lot of power to drive the heavy circular cross-cuts.

It looks like an ideal thing in the way of a slab slasher for this purpose would be to set up a series of band-saws. Say they were mounted on 4-foot wheels that would give them four feet of space between the two sides of the saw blade and then the next one could be set four feet from it and thus with a series of saws with independent wheels, some suspended from above and others supported from below, there would be a free passage for slabs and the work could be done with much less power.

The idea looks good so far, but there are mechanical difficulties in the way, which perhaps will never be overcome. Yet, if the demand for them should become strong enough someone would perhaps solve the problem.

Correcting Shop Customs

In the factory and shop it is the same way; if the desire were strong enough the problem of adapting the band-saw to cross-cut work would be solved eventually but how strong the desire will become and how much effort will be made to use the band-saw for cross-

cut work remains to be seen. There may be some remarkable development in the next few years and then again it may never enter this field extensively.

It is worth while, however, to stop and think about it right now while we are developing the band ripsaw so rapidly, for it is a fact that can be easily demonstrated that the band-saw will do cross-cut work just as easy and clean as it will do rip-sawing. It is simply a matter of whether or not it and the work can be gotten together and the work handled through it conveniently enough to make it advantageous.—C. Taylor in Wood-Craft.

Economical Detailing of Mill Work

Some of the Things to be Avoided in Designing Details—Turning Out Various Kinds of Inside Trim

WITHOUT question one of the most important things about mill work at the present day is the correct and economical detailing of the work to be made. So much of it is special material specified by architects that the stock patterns of the mill cannot be used, thus rendering it necessary to employ details furnished by the architect if he has made any or to detail the work in case this essential part has been omitted, as is very often the case, says Charles Cloukey, writing in a recent issue of the Woodworker. It is not always a bad thing for the mill that the architect fails to furnish full sized or even scale details, for it is frequently the case that the factory draftsman is able to make up a set of details which looks as well or better than the designs of the architect and at the same time costs much less on account of the millman knowing what he has in both knives and lumber.

One of the things to be avoided in designing details is the expense of making molder and shaper knives, unless it is absolutely necessary, for this is one of the acute expenses of the custom or odd work shop. Another thing to be kept in mind in designing and detailing is to keep within the standard sizes of the lumber required in the work. Avoid even widths in inches as much as possible, except in the hardwoods, where it generally takes about an inch in width to straighten up the stock for long jambs, casings, baseboards and the like. One can get a 5¼ in. jamb out of a 6 in. board if it is not too crooked, but to get a full 6 in. head casing requires an 8 in. board. If the lumber to be used is quarter-sawed, it is liable to be badly curved edgewise in the drying, and so show a great deal more waste in getting out long stuff than the flat-grained lumber.

Perhaps the function of details is as important in getting out the stock or cutting as it is in finishing or putting the work together, but the value of details in this respect depends largely upon the way the cutting bills are made, and the means furnished the yard man

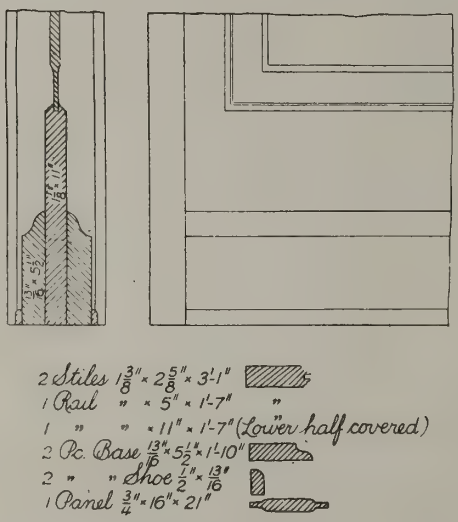


Fig. 1—Showing Just What Is Expected of the Material That is Billed Out

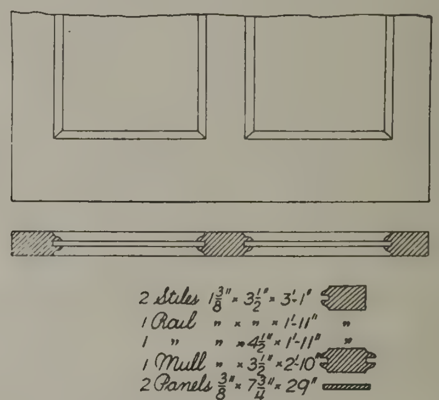
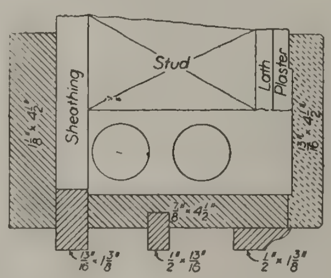


Fig. 2—Cross Section and Partial Elevation of Cupboard Door



4—Horizontal Section Through Window Frame Showing Weight Pocket

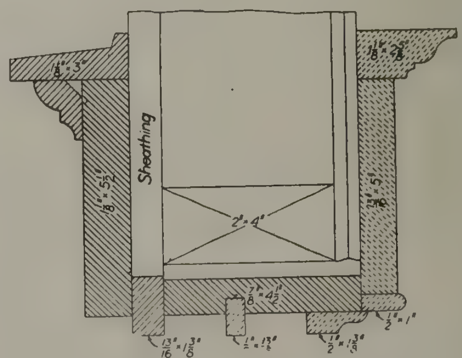


Fig. 3—Horizontal Section Through Window Head, Showing Style of Trim

and the cutter to identify the items and to show the extent to which defects in the lumber may be used.

It is surely flying in the face of Providence nowadays to bill out so many pieces so thick, so wide and so long without any qualifying remarks, unless the stuff has to be absolutely clear. And when specifying the grade from which the pieces are to be cut it is well to add any pertinent information which the bill will carry without becoming confused.

Fig. 1 is intended to illustrate a class of details which shows both the yard man and the cutter, as well as all subsequent workmen, just what is expected of the material billed out. It shows that the bottom rail of this panel work is covered on both sides at the bottom for half of its width, but that the top half must be clear on both sides. It shows that two pieces of base may have defects on one side which will not work out in the ogee at the top, and that a small defect on the face side at the bottom edge will be covered by the shoe at the floor. It shows that the panel frame has a solid sticking, and therefore must be clear on the face edges, and that the panel shows both sides and is raised on both sides. The sketches in the bill serve to identify each piece as a constituent part of the panel work shown, and any workman of a little experience will soon see the significance of using just as poor lumber as he is able instead of the best he can find.

Of course, I am not saying that the yard man and cutter should both spend valuable time in trying to see just how mean stuff they can work into a good job, but the point is that they might spend valuable time in trying to find clear stuff to make the 11 in. bottom rails when the proper stuff lay ready to their hands if they only knew that half of it was to be covered.

I have had very proper stuff sent back to the mill by the owner of a fine residence because he did not understand that the defects in the pieces were to be covered by other members of the finish. The same pieces were sent out the second time, when the owner was out, and he never saw the defects in them again.

In Fig. 2 is shown a cross section and partial elevation of a cupboard door with the piece bill below. Generally speaking, it is not necessary to detail this class of work in the mill, as the men become accustomed to a shop style, and it is only necessary to mention if the work is for paint or for oil finish, and the style of sticking required. If the style is special and the sticking of a detailed pattern, then a drawing something like the figure is a real help. A great deal can be accomplished through the little rough sketches following the items on the cutting bills, and if they are made with some pains, will show the style of sticking.

Bills marked "see detail" should be accompanied by a copy of the detail, and if it is expedient that more than one department use the same detail at the same time, there should be tracings made of it and furnished to each department, so that the work may go forward simultaneously to its completion.

Some foremen give out detached details when it is just as easy to give the group in their respective positions, and so give each workman an insight into the way the work is put together, and teach them to read working drawings. It is an easy step from the full-sized details to the smaller scale drawings, and then on down to the blueprint plans. If every man about a planing mill could read plans correctly, none of them would be any poorer workmen than they are, and a whole lot of them would be more efficient and thereby more valuable to the company and to themselves.

Figs. 3 and 4 are given as an example of the grouping of details. The details tell all the information necessary, except the size of the window and the class of material from which the frame is to be cut.

It will be noted that the inside trim is given a different shading than that of the frame proper, and is not billed out at the time of making the frame. The idea of drawing it in with the frame is to show the opening as a whole and the relation each piece bears to its neighbors, as well as the way the frame members into the wall of the building. This is a great help in billing out the interior finish and in matching up the work at any future time. As in the example Fig. 1, the detail shows the parts exposed, so that the pieces required need be to specified grade only on those parts.

The changing or altering of details is another of the mill man's resources, of no mean value when worked with tact as well as ingenuity. In the first place, if the mill superintendent will take pains to keep the architect in a good humor and help him out of some of the corners he is bound to find himself in occasionally, he can nearly always secure permission to make minor changes in details to correspond with stock material or knives on hand. It is a rare case indeed where the owner would ever see or know the difference in detail.

Perhaps the most perplexing thing about details is the system, or rather lack of system, for filling details after they have been worked through a job. They may be collected and rolled up with the blueprints and filed in that manner, if the plans are not called in by the architect, but in the odd-work mill there are a multitude of details accumulating as the weeks go by, and are of such a nature as to preclude filing with the bills. About the only practical method I know of is to follow the same plan as in filing bills by the vertical alphabetical system, except that the index and folders should be much larger than for the cutting bills, and then it would be necessary to fold up the larger details into a compact compass, which would be neatly contained in the folder without obscuring the index.

Of course, all details should be marked with the name of the customer, the serial number of the order and the sheet number of the cutting bill. This will at once identify them and enable one to find the details from the cutting bill or find cutting bill from detail sheet.

Laying Floors by the Carpenter

SOMETIMES a carpenter who is very clever with his tools is a cabinet maker and almost any carpenter likes to be classed as a man of equal skill with a cabinet maker, yet there are many carpenters who balk at the idea of getting down on their knees to do a cabinet-like job in floor laying. Indeed, sometimes it looks as if the carpenter was bungling over the floor-laying business. He likes to stand flat on his feet and drive flooring nails with a hand ax, adz, or hatchet, but the idea of getting down on his knees and using a nail set and doing a really neat job of floor laying seldom appeals to the average house carpenter.

This is a mistake if a man really wants to qualify himself as a skilled workman. It may do for that class of workmen known as "saw and hatchet men" or to qualify to lay attic floors or sub-floors, but the house to-day really demands a high grade of floors, no matter what the material—whether pine, oak, fir, or maple, there should be a workmanlike job made of it. This means that a man must get down on his knees and use finish nails and a nail set. Moreover, the carpenter who takes pride in his work and in developing skill

should enjoy doing a nice job. It is hard on the knees to get down and lay floors for a week, but the knees can be protected with proper padding and there are enough pride and satisfaction coming from a job well done to repay one afterwards.

So, brother chips, don't balk at the idea of getting down on your knees and laying a floor neatly, but go at it with the intent to make a highly artistic job of it. It takes a little more time and effort, which you should figure on in making your estimate, but when properly done it should bring returns and also in the course of time a reputation for the carpenter that should help him out materially in getting other jobs.

A Fine Type of Dwelling

The dwelling described herewith is one which may be of interest to the customers of some of the prairie retailers. It is one of a number totalling to seventy-five built by the West End Building & Realty Company, of Winnipeg. These houses are very similar in lay-out and finish, but no two are exactly alike; there being enough variation to prevent monotony.

All these dwellings have a number of features in common. They are built upon stone foundations. The walls are of concrete, 18 inches thick. The floor in the basement is of concrete, six inches thick, including the cement finish, one inch thick. The beams are more than usually large, being 8 inches by 10 inches. The beams rest upon 8 x 10 posts, which are supported by footings 1 foot by 2 feet 6 inches.

Construction More Than Usually Substantial

It will be seen that the foundations of these houses are of a most substantial nature. The frame also is built of more than usually heavy material. The floor joists are 2 x 10 throughout, set at sixteen centres and are strengthened by two rows of cross-bridging. The upper joists are 2 x 8 and are strengthened by a system of herring-bone bridging throughout the building. The wall studding is 2 x 4. All heads are doubled.

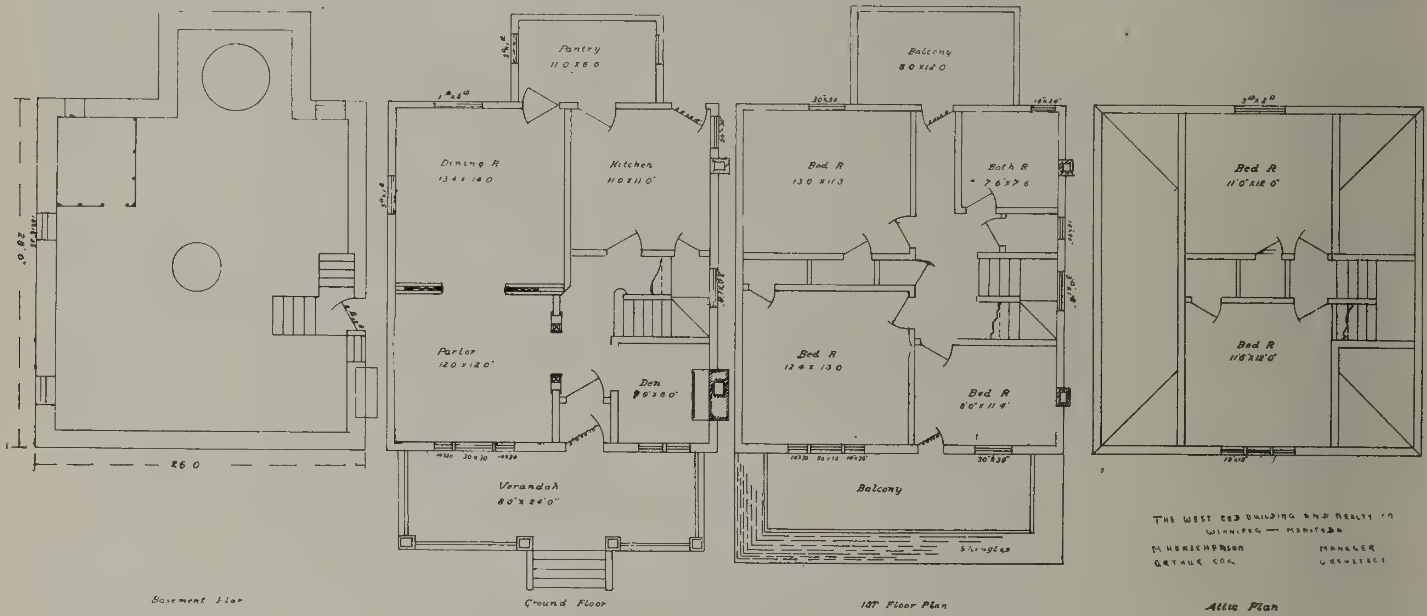
Another feature in connection with these houses is the means taken to render them thoroughly warm. In this respect, no pains have been spared. Starting from the outside the construction of the walls is as follows. One-inch No. 1 ship-lap, one thickness of tar-paper, one layer of insulation, siding, studding, one layer of one-half inch ship-lap, one layer Eddy's sheathing paper, strapping laid at 16 centres, wooden lath and plaster.

In still further carrying out the policy of warmth, each corner is protected with a strip of insulation before the finish siding is put on, thus protecting a portion of the buildings which is generally regarded as one of the most important points to be protected. It will thus be seen that each corner has four thicknesses of paper and insulation combined. The insulation and paper goes under the main roof and over the corner. The roofs are shingled, the shingles being laid four and one-half inches to the weather. The floor joists are beam-filled, into the foundation wall.

Another unusual preventative against cold is the packing of all the window frames with oakum. It is stated that two bales of oakum are used in each of these houses for this purpose.

The Architectural Features

Architecturally, these houses are of a most desirable type. It will be seen from the plans that practically no space is wasted. The plan shown, however, depicts one of the first houses built, which has a hall leading from the landing on the second floor to the balcony at the back. In the greater number of the houses built by this company, this hall has been eliminated and the space thus made available has been used as a sewing room, a few feet of space having been taken from the bath-room on one side and the bedroom on the other. All the outside light is practically from the back and front.



Plan of residences to be erected by Winnipeg building firm.

A number of less important and yet attractive details add to the comfort and convenience of these dwellings. A separate entrance is provided in order that access may be had from the outside to the basement, a distinct addition to the warmth and the cleanliness of the premises. The toilets and baths are separate in practically all the houses. The back verandah is in close proximity to the sewing room—always an attractive feature to the housewife. The back balcony may be fitted with glass in the winter, thus making of it a sun-parlor, the glass being provided for the purpose by the builders. The lay-out of the rooms upstairs, it will be seen at once, is out of

the ordinary, and it is here that more room than usual is utilized. The stairs run from the ground floor continuously to the top floor, the second flight being directly over the first, the landing on the second floor being only 4 feet 6 inches by about 8 feet. The bedrooms, the sewing room, the bath and toilet rooms are all easily within reach of this landing. The linen closet also opens onto this landing. All the bedrooms have closets of an average size of 3 feet by 4 feet. The door of each closet is provided with a British plate mirror, life-size. The exceptionally ample provisions in the way of closets, it is said by the builders, is always a most attractive feature to the prospective purchaser. The basement is comfortably roomy, there being 7 feet 6 inches of space between the top of the concrete floor and the bottom of the floor joists. Laundry tubs are provided. The ceilings of the two main floors are nine feet high.

Practically all the houses are finished in select quarter-cut oak with oak floors. A number have heavy panelled ceilings, while the ceilings of others are of a lighter design. The walls of the dining rooms are panellel for a distance of 5 feet 6 inches from the floor, some being done in wood cruster, others in leatherette. The halls are finished in a similar design and material. The dining room is provided with a plate rail. One fireplace is installed in each dwelling. In one case an old-fashioned fire place, with a fire-place upwards of two feet is provided. The fire-place has the old-fashioned hand-irons. The floors upstairs are of clear white maple, laid on a rough floor of one-inch ship-lap with insulation between.

As has already been stated, no two of the outsides of these dwellings are identical, although the same principles of architecture and construction have been carried out in all. The front entrances are very large, there being side-lights running to the top of each doorway and above, the whole giving a somewhat old-fashioned hand-irons. The floors upstairs are of clear doors are more massive than the ordinary and built of solid oak with a small diamond-shaped light of plate glass. The side-lights are also of plate glass. The front verandahs are in each case 9 feet wide and extend the full width of the house. They are heavily columned, the fronts being ornamented in some cases with elliptical arches, and in other with square arches and shingled.

According to the Labor Gazette, one fatal and seventeen non-fatal accidents were recorded in February, compared with twenty-one non-fatal in January, and one fatal and twelve non-fatal accidents in February, 1912. The fatality was caused by being crushed by an elevator. Twelve of the non-fatal accidents were caused by machinery; two each by falls and falling material, and one by being scalded by steam.

Practical Hints

Every woodworker discovers little short cuts in his work which materially help him to attain rapidity and perfection.

Do not drive a screw into a board with a hammer, as its holding qualities will be greatly lessened.

Always drive nails and brads at an angle, as they will then hold more securely.

In sandpapering always use a block if possible, as this will prevent rounding edges where they are not wanted.

Sandpapering should not be done across grain.

Saws and Re-Saws

An Ingenious Profession

"Why do you want a new trial?"

"On the ground of newly discovered evidence, your honor. My client dug up four hundred dollars that I didn't know he had."

A Way Out

Knicker—"A judge has ruled that a woman should't spend more on clothes than on rent."

Mrs. Knicker—"Well, then, we shall have to pay a bigger rent."

Result of Advertising

"When a duck lays an egg she just waddles off as if nothing had happened.

"When a hen lays an egg there's a whale of a noise.

"The hen advertises. Hence the demand for hens' eggs instead of duck's eggs."

Tit-for-Tat

The Japanese do not like to be called Japs. A noted diplomat was traveling from Tokio to Yokohama, when an American in the car leaned across and said: "Say, what 'ese' are you: Chinese or Japanese?"

Quick as a flash came in excellent English: "May I inquire what 'key' are you: Yankee or monkey?"

Good Port but Poor Crew

There is a story told of Spurgeon, who was holding a revival meeting. He asked those in the audience who wished to go to Heaven to stand up. They all stood up except one, a sailor. Mr. Spurgeon asked him why he kept his seat. "Don't you want to go to Heaven?" he enquired. "Not with that crew," was the reply.

In the Shop

"Life is a hard grind," said the emery-wheel.

"It's a perfect bore," said the auger.

"It means nothing but hard knocks for me," sighed the nail.

"You haven't so much to go through as I have," put in the saw.

"I can barely scrape along," complained the plane.

"And I am constantly being sat upon," added the bench.

"Let's strike," said the hammer.

"Cut it out," cried the chisel.

And all was silence.

They brought the condemned man out on the gallows.

"Henry," said the sheriff, "have you anything to say?"

"Yes, sah. I'se got a few words to say. I merely wish to state dat dis suttingly is goin' to be a lesson to me!"

Three Germans were sitting at luncheon recently and were overhead discussing the second marriage of a mutual friend, when one of them remarked:

"I'll tell you vhat. A man vhat marries de second time don't deserve to have lost his first vhife."

Trade Happenings and Opportunities

Woodworking News—From Coast to Coast

Mr. H. D. Eckhardt, furniture dealer, Theodore, Sask., has sold out.

Eugene Bisson and Chas. Cote have registered to carry on a furniture business at Montreal.

St. Monique Station Furniture Company, Limited, Grand St. Esprit, Que., has obtained a charter.

Tremblay & Frere have been registered to carry on a sash and door business in Montreal, P. Q.

Reitzel Bros., Waterloo, Ont., are building a one-storey reinforced concrete planing mill, 70 x 126 feet.

The Colonial Furniture factory at Strathroy, Ont., suffered several thousand dollars' loss from the heavy wind-storm last month.

The woodworking plant of Rhodes, Curry & Company, Halifax, N.S., was recently destroyed by fire. The estimated loss is $40,000.

The piano factory of Baldwin Robinson Company, Limited, St. Thomas, Ont., was recently destroyed by fire, involving a loss of $100,000.

A five-storey piano factory is being erected at 75 Sherbourne street, Toronto, Ont., by the Gerhard-Heintzman Co. The estimated cost is $25,000.

Nelson & Foster, 1398 Erin street, Winnipeg, Man., are having plans prepared for a sash and door factory on William avenue, near Arlington street.

The sawmill owned by T. Harvey, Chicoutimi, Que., was recently destroyed by fire. The estimated loss is $6,000. There was no insurance on the plant.

The Pacific Lumber Agency, of Aberdeen, Washington, has registered as an extra-provincial company, with head office for British Columbia at Vancouver.

Tremblay and Brother, Montreal, P.Q., have been registered to carry on a sash and door manufacturing business. The members are J. W. Tremblay and A. Tremblay.

Hay & Company's piano and organ factory at Woodstock, Ont., recently suffered some loss when the roof caught fire from a spark from the smoke-stack and was destroyed.

Tenders were closed recently for a piano factory at Amherst, N.S., to be erected by Amherst Pianos, Limited. Mr. J. A. McDonald, Halifax, N.S., may be addressed for particulars.

At a recent meeting of the town council of Scotstown, P.Q., it was decided to grant a free site to a local organization contemplating the erection of a large and up-to-date chair factory.

A large lumber yard is to be built at the corner of Danforth and Warden avenues, Toronto, five acres having been purchased for this purpose at a price of $25,000 a acre. The yard will supply local builders.

The Simonds Manufacturing Company have published a practically interesting little booklet in their "Guide for Millmen." The booklet is well illustrated and shows many of the latest products of this well-known firm.

Most of the machinery in the plants of the Duhamel Willow Furniture Company, St. Hyacinthe, P.Q., and the Poirier Chair & Casket Company, Roxton Falls, was supplied by the Canadian Fairbanks-Morse Company, Limited, Montreal.

The Office Specialty Company are building a finishing room at their plant at Newmarket at a cost of $30,000. The addition will be three storeys high, of mill construction and red pressed brick exterior. J. L. Youngs, of Stratford, is the contractor.

H. R. Van, Geo. N. Thompson and Geo. H. Gatton are negotiating with the town of Megantic, Que., for a loan of $25,000 to be applied in the organization of a new company which will build an up-to-date furniture factory to replace the one destroyed by fire recently.

The ratepayers of Lake Megantic, Que., have voted exemption from taxes for ten years and a loan of $7,000 to P. Cliche, of Beauce Junction, who will put up a brush and broom factory. Mr. Cliche will organize a company under the name of the Lake Megantic Broom Company.

A fire which originated in the dry kiln of the S. R. Hughes Lumber Company, Toronto, on April 21st, did damage to the extent of $2,500. Owing to the fact that the building is equipped with fire-doors, the blaze was confined to the rear part of the building, which was badly damaged.

Considerable damage was done to the factory of the American Furniture Company, Owen Sound, Ont., by the gale which visited that plant recently. One wall was completely wrecked and much damage was done to the contents of the building by water from the sprinkler system.

The Green Lumber & Furniture Company, Limited, has been incorporated with a capital of $25,000, to carry on business as timber and lumber merchants and to manufacture and deal in all articles of wood. The head office of the company is to be at Victoria, B.C.

The Port Alberni Lumber Company, Limited, has been incorporated with a capital of $25,000, for the purpose of carrying on a general sawmill and lumber business and to manufacture and deal in lumber and wood of all kinds. The head office is to be at Victoria, B.C.

Industrial Planing Mills, Limited, has been incorporated with a capital of $40,000, to manufacture and deal in lumber, wood and builders' supplies, with head office at Toronto. The provisional directors are Dan. Sweetman, John Monkhouse and Emerson Tiers, all of Toronto.

Mr. W. L. Rice, for many years one of Welland's most prominent citizens and proprietor of lumber yards and planing mill, died recently. He had been in a critical condition for some months, a complication of diseases causing his death. Deceased was 55 years of age.

Industrial Planing Mills, Limited, have been incorporated with a capital of $40,000 to manufacture and deal in lumber, wood and builders' supplies, with head office at Toronto. The provisional directors are D. Sweetman, John Monkhouse and Emerson Tiers, all of Toronto.

Among the recent incorporations in British Columbia of interest to the woodworking trade are The Lake Lumber Company, Limited, Lozells, P.Q.; Coast Contract Company, Limited, Vancouver; Leamington Logging Company, Limited, Vancouver.

The plants of the Canada Casket Company and the

Lusty Lumber Company, at Rodney, Ont., were completely destroyed by fire a few days ago. A large amount of lumber was also burned, the loss being about $20,000, with insurance of $9,000.

Chappel Bros. & Company, Limited, Sydney, C.B., are making arrangements for the erection of new offices and other improvements to their business at Sydney. Their new stationary sawmill on the Mira River will be erected either during the present month or during the month of May.

The Rhodes-Curry Company's woodworking plant, Halifax, N.S., was destroyed by fire recently at a loss of $50,000. The plant, which was one of a chain operating under a common management in various towns of the Maritime Provinces, was fully insured. The fire is thought to have been the work of incendiaries.

A. F. Byers & Company, Limited, have been incorporated with a capital of $100,000 for the purpose of carrying on the business of builders, woodworkers, etc. The head office of the company is to be at Montreal. The incorporators are: R. T. Heneker, W. S. Johnson, E. J. Waterson, Hugh Wylie and Mabel Hyndman, all of Montreal.

A new industry is practically assured for Guelph in the shape of a branch of the R. Laidlaw Lumber Company, of Toronto. The site will be on the old rolling mills property in St. Patrick's Ward, which the company is purchasing outright from the city for the sum of $5,000. It will erect a planing mill and sash and door factory.

The Standard Lumber Company, Limited, has been incorporated with a capital of $100,000 to manufacture and deal in lumber, furniture, sashes, doors and other articles of wood. The head office is to be at Sturgeon Falls, Ont. The incorporators include A. G. Robertson, J. J. Kew and E. R. Maltby, all of Toronto.

Wm. Croft & Sons, Limited, have been incorporated with a capital stock of $400,000 for the purpose of manufacturing and dealing in logs, lumber, timber and all articles into the manufacture of which wood enters. The head office of the company will be at Toronto. The incorporators are Jas. S. Lovell, Chas. D. Magee and Joseph Ellis, all of Toronto.

A feature of the Democratic tariff revision bill recently presented in Congress was the removal of duty from all sawn boards except cabinet wood, while the duty of sawed cabinet wood has been reduced from 12.75 to 10 per cent., on casks and barrels from 30 to 14.77 per cent., and on house furniture from 35 to 15 per cent.

Haley & Son, Limited, has been incorporated in the province of New Brunswick, with a capital stock of $80,000, for the purpose of carrying on a general lumber, woodworking and saw-milling business in all branches. The head office of the company is to be at St. Stephen, N.B., and the provisional directors are: Henry Haley, J. L. Haley, J. A. Haley, J. M. Flewelling and J. W. Richardson.

On Saturday, April 5th, J. R. Booth, millionaire lumberman, manufacturer and owner of railways, celebrated his 86th birthday in the same way as he has spent the anniversary of his birth since he was a boy, that is, at work in his mills. In spite of his advanced age, Mr. Booth is enjoying as good health as he did sixty years ago. His staff presented him with eighty-six magnificent roses.

Jas. Leigh & Sons, Limited, who operate a sawmill, sash and door factory and interior finish shop at Victoria, have improved their mill facilities by the erection of a new brick burner, 70 feet in height and 20 feet in diameter, complete with refuse conveyors. The company has opened a display room for stock at the corner of Turner street and Esquimalt road.

The Canadian Pulp & Paper Company, Limited, has been incorporated with a capital of $25,000, to carry on business as manufacturers and dealers in wood, pulp and paper of all kinds, also to construct and operate pulp and paper mills, to manufacture timber, logs and lumber, etc., with head office at Latchford. The provisional directors are J. S. Lovell, Wm. Bain and Robt. Gowans, all of Toronto.

The Howe Sound Mills & Logging Company, Limited, has been incorporated with head office at Vancouver, B.C., and capital stock of $150,000, to purchase certain timber licenses, shingle mill and equipment from B. A. Lewis, C. S. Roray, Jr., and H. D. Bewbury, and to carry on business as timber merchants, sawmill, shingle mill and pulp mill owners, loggers, lumbermen, and lumber merchants.

In the details of the forest policy of British Columbia, given out recently at Victoria by Hon. W. R. Ross, it is gratifying to find the Government promising "to encourage manufacturing of timber into furniture, vehicles, implements, etc., within the province, and to conduct experiments to determine the commercial possibilities of turpentine, wood alcohol and other manufacturers from timber products, etc."

The Smith Furniture Company, Limited, has been incorporated with a capital of $40,000 to manufacture furniture, boxes, metal work, etc., and carry on business as lumber dealers, saw and planing millers, wood-workers, etc., with head office at London. The provisional directors are H. T. Smith and C. J. Smith, furniture dealers, and J. W. G. Winnett, barrister, all of London.

The Bulman Lumber Company's sawmill at Cushion Cove, Salt Springs Island (opposite Sidney), has circular rig and two planers, the capacity being about 20,000 feet per day. It has been operated steadily all the winter. The lumber is placed on scows and delivered in Victoria or elsewhere by the company's tugs. A small woodworking shop at their James' Bay yard in Victoria was destroyed by fire last fall, but will be rebuilt on a larger scale this spring.

An interesting booklet entitled, "How to Sharpen," is to hand from the Star Hardware & Supply Company, Toledo, Ohio. The publication is devoted to the merits of the sharpening stone manufactured by the Pike Manufacturing Company, of Pike, New Hampshire, U.S.A. The mechanic who may be looking for a good bench stone or a grinder will be well advised to write to the company for a copy of their illustrated catalogue.

The new sawmill of the Cedar Cove Sash and Door Company, Limited, adjoining the plant of the Imperial Shingle Company, False Creek, was started for a trial run last month. Both plants are now in steady operation. The Cedar Cove factory will be busy on orders until the new sash, door and trim building on False Creek is erected. When everything is in shape Gadd & Giberson will have a first-class plant. The former will have charge of the factory, the latter superintending the saw, shingle and planing mill.

R. Truax & Son, Walkerton, Ont., are drawing up plans for a one-storey sash and door factory. The building will be 300 feet long x 60 feet wide with cement foundations and a cement floor 10 inches thick. The walls will be of brick 12 feet high, with a row of roof windows in the centre above and at each end. This factory will provide a ltitle more room than the company have in their present place and will enable them to place all their machinery and workmen on one floor.

The planing mill which is being erected at Bridgeburg, Ont., by O. C. Teal will probably be completed by the middle of April. The mill is thoroughly up-to-date in every respect and is situated just to the east of the Fort Erie race track. The building is a two-storey structure of concrete, 48 x 80 feet, equipped with the latest machinery, furnished by Cowan & Company, Galt, Ont., and electric power

for which the equipment was installed by the Canadian General Electric Company.

The J. H. Preston Planing Mills at Medicine Hat (owned by Mr. J. H. Preston), are planning the erection of a large new plant to take care of the increasing demands on their output. This concern manufactures doors, sash, interior finish of all kinds, mouldings and hardwood fixtures. All kinds of wood turning are included in their business. The mill to be erected will cost $50,000. Mr. Preston has been in Medicine Hat for ten years. He was formerly a contracting carpenter, so that in taking on this business he has a practical knowledge of its requirements.

Quance Bros., Delhi, Ont., report that the recent fire at their plant destroyed the sawmill and interfered with the operation of their planing mill as the boiler fittings and stacks were destroyed. The boilers and stacks have been overhauled and refitted and operations were commenced again on April 2nd. They also report that as the timber supply in their vicinity is nearly exhausted they will rebuild their sawmill on a smaller scale, to cut from 10,000 to 12,000 feet per day. The mill will be rebuilt in the near future. Their loss amounted to $5,000.

Lauder, Spears and Howland, Kent Building, Toronto, are putting up a new mill on the Pickerel River about six miles distant from the crossing of the Canadian Northern and the Canadian Pacific Railways. The mill will have a capacity of about 20,000 feet per day. The firm have taken out about 50,000 pine logs at the Pickerel mill and also at the mill in Mowat, which is manufacturing for them under contract. The Mowat mill is already operating upon pine bill timber and the Pickerel mill will commence operations early in the month of May.

Quality Furniture Makers, Limited, is a new company recently organized in Welland with a capital of $40,000. A charter has been applied for. This new concern has acquired the concrete building lately occupied by the Hamilton Tube Works and will manufacture high-class upholstered easy chairs, davenports and couches, also a line of mattresses. The machinery and stock for the furniture department has been ordered for immediate delivery and it is expected that the plant will be in operation by May 1st. The provisional directors are Messrs. B. J. McCormick, H. L. Hatt and L. C. Raymond, of Welland, and Alex. Mc.Laughlin, of Toronto.

An Elysian Prospect

When Earth's last log has been loaded
And hauled, and the lumber made;
When the Final Dwelling is builded
And the bill for the building paid;
We shall rest in Celestial Forests,
We shall sleep—and most likely snore—
Till the Big Woods-Boss shall call us
And set us to work once more.

Then those who worked well shall be happy,
They shall have no bones in their backs;
They shall fell, and never be weary,
With a glittering golden axe:
The axes shall never be sharpened
And the saws shall never be filed;
The foreman shall never rush us,
And never get peeved or riled.

The logs shall be sweetly scented—
Mahogany, sandalwood, teak—
And a full month's pay shall be given
For each day's work in the week:
There shall be no snakes to bite us,
And the sun shall never grow hot;
We shall work just as long as we want to,
In the Land of Things that Are—Not!

—C. Henry.

Among the companies recently incorporated in B. C. for the purpose of manufacturing or dealing in lumber, timber or articles of wood are: Silverbrook Timber and Development Company, Limited, Fernie; The Shaughnessy Manufacturing Company, Limited, Vancouver; Royal City Lumber & Shingle Company, Limited, New Westminster; Mutual Lumber & Shingle Company, Limited, Vancouver; Westminster Shingle Company, Limited, Vancouver; Newcastle Lumber Mills, Limited, Vancouver; Kennett, Tinney & Company, Limited, Vancouver; Pacific Box Company, Limited, Vancouver, and Green Lumber and Furniture Company, Limited, Victoria.

A complete and up-to-date woodworking factory was opened at Midland, Ont., by Messrs. Benson & Bray, during the last week of March. Throughout the building and equipping of this plant Benson & Bray have had constantly in mind the greatest efficiency at the least expense of labor. Modern machinery will be installed throughout. As is usual in factories of this kind, the lighter work, including the manufacture of doors, sash, blinds, etc., will be done on the second floor, while the heavier work will be conducted on the ground floor. The cost of the plant and equipment exceeded $100,000 and when running to capacity it will give employment to over one hundred men.

The Revelstoke Sawmill Company, Limited, has purchased a large site where it will erect an extensive plant. The Revelstoke Company in Medicine Hat bought out Harlow & Company. Some six months later the yards were moved to North Railroad street and each year has been an improvement over the preceding one, in volume of business done. Some fifteen men are now employed and three teams used. Mr. MacGean, the superintendent, has been in Medicine Hat for fourteen years and was the first employee there of the Revelstoke Company. He was in Swift Current for that corporation for a few months, but since then he has made this city his headquarters. He has been a skillful organizer and has been effective in promoting the business in Medicine Hat and in stimulating operation in other yards.

L. L. Buckley, New Westminster, B. C., is organizing a company with a view to the erection of a modern planing and re-saw mill. It is understood that two dry kilns are to be constructed for drying shingles which Mr. Buckley intends to bring from his shingle mill at Sechelt for the eastern export trade. Re-saw, planing and edging machinery will be installed, the rough cut lumber being transported from the various small mills along the coast in which Mr. Buckley is interested. The machinery for the plant is expected to arrive in about two weeks when the work of installation will be commenced. A new boiler and boiler house will be erected in connection with the dry kilns. All the machinery to be used will be operated by electrical motors. A conveyancer reaching from the kilns to the wharf will also be erected to facilitate marine shipping.

The Reliance Sash & Door Company, Limited, whose factories are located at the corner of Front, Alberta and Dufferin streets, Vancouver, have orders booked ahead aggregating the enormous total of $924,000, all of which are receiving due attention. Suitable arrangements have also been made for the prompt handling of all new business placed with any of the departments. A night crew is now

employed in addition to the day force, and Mr. Challenger, the manager, has in all 184 hands on the pay-roll. Goods are being shipped as far east as Amherst, Nova Scotia, and westward to China, Japan, New Zealand and Australia. The furnishing of interior trim for office blocks, apartment houses and residences is being made a leading department of the firm's operations, the work being done by their own staff under the superintendence of one of the best experts to be found on the Pacific Coast. Encouraged by the volume of business offering, the company recently purchased a large block of land, on which will be erected a factory of imposing dimensions, to be equipped with the most up-to-date machinery known to the trade.

Screw Hand Press for Punching Saws

A screw hand press for punching holes in the middle of saws has been installed by the Radcliff Saw Manufacturing Company, Toronto. The press, which is capable of punching holes in the centre of saws 44 inches in diameter, was furnished by W. H. Banfield & Sons, Toronto. It dispenses with the old method of drilling the holes and it can punch a 4¼-in. hole in 3/8-in. stock. The uprights are 3½ inches in diameter and the steel screw is 4¼ inches in diameter, and has a double thread 2 in. pitch. The total weight is 3,500 pounds.

A 42-inch shingle saw contains 18 holes, 5/8-in. diameter and a 4¼-in. hole in the centre. With an ordinary machine drill, it would take a man ten minutes to punch each small hole and twenty minutes to punch the one in the centre. With this press, the 19 holes can be punched in five minutes, punching one hole at a time.

Casket Merger Completed

The casket manufacturers have completed the merger of all their interests into one huge concern, which will have a capitalization of about $1,500,000. The negotiations among the various units have been directed chiefly by A. J. H. Eckhardt, of the National Casket Company, Toronto. The concerns entering the merger are as follows:—National Casket Company, Toronto; Globe Casket Company, London; Semmens and Evel, Hamilton; Christie Bros., Amherst, N.S.; Girard & Godin, Three Rivers, Que.; J. S. Elliott & Son, Prescott; Winnipeg Casket Company, Winnipeg.

The head office will be in Toronto, and the merger will operate under a Canadian charter, the official notice of which will be made at an early date.

For four years efforts have been made periodically to get the casket manufacturers together, but with the exception of this final effort, all previous attempts failed.

The individual owners, or companies, were given the privilege of selling out entirely or accepting preferred or common stock in the new concern.

The object of the merger, it is stated, is to cut down overhead charges and eliminate needless competition.

Trade Enquiries

The Dominion Government Trade and Commerce reports contain the following trade enquiries. Readers of the Canadian Woodworker may obtain the names of enquirers by writing to the Department of Trade and Commerce and stating the number of the enquiry.

307. **Box boards.**—An Edinburgh firm inquires for fifteen tons of box boards suitable for making cake boxes as used by bakers and confectioners.

308. **Pulp boards.**—A Glasgow firm inquires for manufacturers of pulp boards for box making.

316. **Flooring.**—A London company specializing in mosaic, marble, wood and other flooring, wishes to arrange for the sale of these lines in Canada.

345. **Wooden seats.**—A Glasgow firm is open to purchase large quantities of water closet seats.

337. **Broom handles.**—A Glasgow firm inquires for broom handles 49-in. by 1⅛-in., made of clean white wood such as spruce, fairly free from knots. Could also buy in lengths of 27¼-in. to 73-in.

He Had a Name

Patrick, lately over, was working in the yards of a railroad. One day he happened to be in the yard office when the force was out. The telephone rang vigorously several times, and at last he decided it ought to be answered. He walked over to the instrument, took down the receiver and put his mouth to the transmitter, just as he had seen others do.

"Hillo!" he called.

"Hello!" answered the voice at the other end of the line. "Is this eight-six-one-five-nine."

"Aw, g'wan! Phwat d' ye t'ink Oi am? A box car?"

BUYER'S DIRECTORY

AUTOMATIC DOVETAIL GLUE JOINTER
Canadian Linderman Machine Co., Ltd., Woodstock, Ont.

AUTOMATIC GLUE CLAMP CARRIER
Nels J. Billstrom, 1315 Tenth street, Rockford, Ill.

BABBITT METALS
Shurly Dietrich Co., Ltd., Galt, Ont.
Fay & Egan Co., Cincinnati, O.
Canada Metal Co., Ltd., Toronto.

BALUSTER LATHES
C. Mattison Machine Works, Beliot, Wis.
Thos. White & Sons, Paisley, Scotland.
Chicago Machinery Exchange, Chicago, Ill.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.
Canada Machinery Corp., Ltd., Galt, Ont.

BAND SAW FILING MACHINERY
Shurly Dietrich Co., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

BAND SAWS
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Shurly Dietrich Co., Ltd., Galt, Ont.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
R. H. Smith Co., Ltd., St. Catharines, Ont.

BAND SAW MACHINERY
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
H. W. Petrie, Ltd., Toronto.

BAND SAW MILLS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., Cincinnati, Ohio.

BAND SAW STRETCHERS
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

BENDING MACHINES
Fay & Egan Co., Cincinnati, Ohio.

BELTING
J. A. Fay & Egan Co., Cincinnati, Ohio.
Sadler & Haworth, Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
H. W. Petrie, Ltd., Toronto.

BELTS (Endless)
Candada Machinery Agency, Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Sadler & Haworth, Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
H. W. Petrie, Ltd., Toronto.

BELT CEMENT
Sadler & Haworth, Montreal.

BELT FASTENERS
Sadler & Haworth, Montreal.

BELT DRESSING
Sadler & Haworth, Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

BLOWERS
Sheldons Limited, Galt, Ont.
H. W. Petrie, Ltd., Toronto.

BLOW PIPING
Sheldons Limited, Galt, Ont.

BOILERS
Canada Machinery Agency, Montreal.
H. W. Petrie, Limited. Toronto.

BORING MACHINES
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Mussens, Limited, Montreal.
J. M. Nash, Milwaukee, Wis.
Valley City Machine Works, Grand Rapids. Mich.
H. W. Petrie, Limited, Toronto.

BOX MAKERS' MACHINERY
Canadian Linderman Co., Ltd.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.

BROKEN CASTINGS BRAZED—MACHINIST AND DIE MAKER
W. H. Dunne, 1492 Queen St. West, Toronto.

CABINET PLANERS
Canada Machinery Corporation, Ltd., Galt, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Agency, Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Valley City Machine Works, Grand Rapids, Mich.
Baxter D. Whitney & Son, Wichendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Ltd., Toronto.

CARS (transfer)
Sheldons Limited, Galt, Ont.

CARVING MACHINES
Canada Machinery Corporation, Ltd., Galt, Ont.
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Hespeler Machinery Co., Ltd., Hespeler, Ont.
Valley City Machine Works, Grand Rapids, Mich.

CHISELS
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

CIRCULAR SAW MILLS
Canada Machinery Agency, Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
H. W. Petrie, Limited, Toronto

CHAINS (Silent)
Jones & Glassco, Montreal

CLAMPS (Chain, Carpenter, Cabinet, Pattern Makers, Bench, Mitre, Piling, Mounted and Rotary Wheel)
Black Bros. Machinery Co., Mindota, Ill.
J. A. Fay & Egan Co., Cincinnati, Ont.

CLAMPS (Saw)
Shurly Dietrich Co., Ltd., Galt, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

CLUTCHES
J. A. Fay & Egan Co., Cincinnati, Ohio.

COLUMN CLAMPS
Black Bros. Machinery Co., Mendota, Ill.

COLUMN MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.

CORE BOX MACHINES
J. A. Fay & Egan Co., Cincinnati, Ohio.
Chicago Machinery Exchange, Chicago, Ill.
E. & B. Holmes Machinery Co., Buffalo, N.Y.

CUT-OFF SAWS
Canada Machinery Corporation Ltd., Galt, Ont.
Shurly Dietrich Co., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Berlin Machine Works, Ltd., Hamilton, Ont.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

CUTTER HEADS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Lamson Cutter Head Company.
Samuel J. Shimer & Sons, Milton, Pa.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

DADO HEADS
C. Mattison Machine Works, Beloit, Wis.
W. A. Elliott, Bathurst and College Sts., Toronto.

DIEMAKERS & MACHINISTS
W. H. Dunne, 1492 Queen St. West, Toronto.

DISK GRINDERS
J. A. Fay & Egan Co., Cincinnati, Ohio.

DOGS (Saw Mill)
J. A. Fay & Egan Co., Cincinnati, Ohio.

DOVETAILING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canadian Linderman Machine Co., Ltd., Woodstock, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

DOWEL MACHINES
Thos. White & Sons, Paisley, Scotland.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Dauber-Bell Machine Company.
J .A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Valley City Machine Works, Grand Rapids, Mich.

DRYING MACHINERY
Sheldons Limited, Galt, Ont.
Morton Dry Kiln Co., Chicago, Ill.

DRY KILNS
Sheldons Limited, Galt, Ont.
Morton Dry Kiln Company, Chicago, Ill.

DUST COLLECTORS
Sheldons Limited, Galt, Ont.

DUST SEPARATORS
Sheldons, Limited, Galt, Ont.

EDGERS (Gang)
Berlin Machinery Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

EDGERS (Single Saw)
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Agency, Montreal.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

END MATCHING MACHINE
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

ENGINES (Steam)
H. W. Petrie, Limited, Toronto.

EXHAUST FANS
Sheldons, Limited, Galt, Ont.

FLOORING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corporation, Ltd., Galt, Ont.
Baxter D. Whitney & Son, Winchendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

FLINT
Wausau Quartz Co., Wausau.

FLUTING HEADS
J. A. Fay & Egan Co., Cincinnati, Ohio.

GAINING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Canada Machinery Corporation, Ltd., Galt, Ont.
H. W. Petrie, Limited, Toronto.

GAS ENGINES
H. W. Petrie, Limited, Toronto.

GAUGES (Saw)
Shurly Dietrich Co., Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver B. C.

GLUE CLAMPS
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.

GLUE HEATERS
J. A. Fay & Egan Co., Cincinnati, Ohio.

GLUE JOINTERS
Canada Machinery Corporation, Ltd., Galt, Ont.
Canadian Linderman Company, Limited, Woodstock, Ont.
Chicago Machinery Exchange, Chicago, Ill.

GLUE SPREADERS
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

GRINDERS (Cutter)
J. A. Fay & Egan Co., Cincinnati, Ohio.

GRINDERS (Knife, etc.)
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

GRINDERS (Tool)
J. A. Fay & Egan Co., Cincinnati, Ohio.
Valley City Machine Works, Grand Rapids, Mich.

GROOVING HEADS
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Samuel J. Shimer & Sons, Milton, Pa.
Canada Machinery Corporation, Ltd., Galt, Ont.

HAND PROTECTORS
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Jones Safety Device Co., Hamilton, Ont.

HAND SCREWS
Black Bros. Machinery Co., Mendota, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

HEATING APPARATUS
Sheldons, Limited, Galt, Ont.

HANDLE AND SPOKE MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
J. M. Nash, Milwaukee, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.

HUB MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

HYDRAULIC VENEER PRESSES
Wm. R. Perrin & Co., Ltd., Toronto.

INJECTORS
H. W. Petrie, Limited, Toronto.

JOINTERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canadian Linderman Co., Ltd., Woodstock, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Plessisville Foundry, Plessisville, Que.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

KNIFE GRINDERS
Rogers & Coampany, Samuel C.

KNIVES (Planers and Others)
Shurly Dietrich Co., Ltd., Galt, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Samuel J. Shimer & Sons, Milton, Pa.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
H. W. Petrie, Limited, Toronto.

LACE LEATHER
Sadler & Haworth, Montreal.

LATHES (Pattern Makers')
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Valley City Machine Works, Grand Rapids, Mich.
H. W. Petrie, Limited, Toronto.
Thos. White & Sons, Paisley, Scotland.

LATHES (Turning)
Berlin Machine Works, Lid., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Valley City Machine Works, Grand Rapids, Mich.
Baxter D. Whitney & Son, Winchendon, Mass.
H. W. Petrie, Limited, Toronto.

LOOSE PULLEYS
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corporation, Ltd., Galt, Ont.

LUBRICANTS AND GREASES
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.

LUMBER
Anderson Lumber Company, C. G.
Elgie & Jarvis, Toronto.

MITRE MACHINES
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N. Y.
H. W. Petrie, Limited, Toronto.

MITRE SAWS
Shurly Dietrich Co., Ltd., Galt, Ont.
E. C. Atkins & Co., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corporation, Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

MITRE CLAMPS
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.

MORTISING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Jones & Glassco, Montreal.
Valley City Machine Works, Grand Rapids, Mich.
H. W. Petrie, Limited, Toronto.

MOTORS
J. A. Fay & Egan Co., Cincinnati, Ohio.

MULTIPLE BOXING MACHINES
J. A. Fay & Egan Co., Cincinnati, Ohio.
J. M. Nash, Milwaukee, Wis.

PACKINGS
Both Felt Company

PATTERN SHOP MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

PICTURE FRAME MACHINERY
Black Bros. Machinery Co., Mendota, Ill.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.

PLANES
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corp., Ltd., Galt, Ont.

PLANERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

PLANING MILL MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Chicago Machinery Exchange, Chicago, Ill.
C. Mattison Machine Works, Beloit, Wis.
Samuel J. Shimer & Sons, Milton, Pa.
Baxter D. Whitney & Son, Winchendon, Mass.
Black Bros. Machinery Co., Mendota, Ill.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie Co., Ltd., Toronto.

POLISHING MATERIAL
Gray & Company, H.

PULLEYS
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

RESAWS
Shurly Dietrich Co., Ltd., Galt, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

RESAWS
H. W. Petrie, Limited, Toronto.

RIM AND FELLOE MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corp., Ltd., Galt, Ont.

RIP SAWING MACHINES
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Canada Machinery Corp., Ltd., Galt, Ont.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

SAFETY GUARDS (For Band Saw Machines, Jointers, Rip Sawing Machines, Shapers, Swing Saws, etc.)
Chicago Machinery Exchange, Chicago, Ill.
Fair Manufacturing Company, Racine, Wis.
Jones Safety Device Co., Hamilton, Ont.

SANDERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
J. M. Nash, Milwaukee, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Fisher Sander Co., Berlin, Ont.
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.
Elliot Woodworker Co., Toronto.

SANDPAPER
Black Bros. Machinery Co., Mendota, Ill.

SANDERS (Moulding, Belt and Panel)
Black Bros. Machinery Co., Mendota, Ill.
Chicago Machinery Exchange, Chicago, Ill.
H. W. Petrie, Ltd., Toronto.

SASH, DOOR INTERIOR TRIM AND COLUMNS
M. Brennan & Sons, Hamilton, Ont.

SASH, DOOR AND BLIND MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Samuel J. Shimer & Sons, Milton, Pa.
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.

SAWS (Hand)
Shurly Dietrich Co., Ltd., Galt, Ont.
E. C. Atkins & Co., Hamilton, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

SAW MILL MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
H. W. Petrie, Limited, Toronto.

SAW SWAGES, AUTOMATIC FILERS
E. C. Atkins & Co., Hamilton, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.

SAW TABLES
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

SCRAPING MACHINES
Baxter D. Whitney & Son, Winchendon, Mass.
Chicago Machinery Exchange, Chicago, Ill.

SCROLL SAWS
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Shurly Dietrich Co., Ltd., Galt, Ont.
E. C. Atkins & Co., Hamilton, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.

SECOND HAND MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
H. W. Petrie, Limited, Toronto.

SHAPERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Samuel J. Shimer & Sons, Milton, Pa.
Baxter D. Whitney & Son, Winchendon, Mass.
H. W. Petrie, Limited, Toronto.

SHAVING COLLECTORS
Sheldons, Limited, Galt, Ont.

SINGLE SPINDLE BOXING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.

STAVE SAWING MACHINE
Baxter D. Whitney & Son, Winchendon, Mass.

STORE FIXTURES, FITTINGS
Reflector & Hardware Specialty Mfg. Co. Chicago, Ill.

SURFACERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.
Chicago Machinery Exchangefi, Chicago, Ill.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

SWING SAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

TABLE LEG LATHES
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Thos. White & Sons, Paisley, Scotland.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.

TENONING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
H. W. Petrie, Limited, Toronto.

TOOLS (Hand)
J. A. Fay & Egan Co., Cincinnati, Ohio.
Samuel J. Shimer & Sons, Milton, Pa.

TRIMMERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

TRUCKS
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Sheldons, Limited, Galt, Ont.

TURNING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.
H. W. Petrie, Limited, Toronto.

UNDER-CUT SELF-FEEDING FACE PLANER
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.

GUMMERS, ETC.
E. C. Atkins & Co., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

UNIVERSAL WOODWORKER PLANER
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
W. A. Elliot, Bathurst St., Toronto, Ont.
H. W. Petrie, Limited, Toronto.

VENTILATING APPARATUS
Sheldons, Limited, Galt, Ont.

VENEER DIERS
Sheldons, Limited, Galt, Ont.

VENEER PRESSES (Hand and Power)
Hydraulic Press Mfg. Co., Mount Gilead, Ohio.
Black Bros. Machinery Co., Mendota, Ill.
William R. Perrin & Company, Toronto, Ont.

VISES (Band Saws)
Shurly Dietrich Co., Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
H. W. Petrie, Limited, Toronto.

VISES (Pattern Makers')
J. A. Fay & Egan Co., Cincinnati, Ohio.

VISES (Circular Saws)
E. C. Atkins Co., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
H. W. Petrie, Limited, Toronto.

WAGON AND CARRIAGE MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.

WASHERS
Booth Felt Company

WASTE, COTTON
Gray & Company, H.

WIPING MATERIAL
Gray & Company, H.

WINDOW FRAME MACHINERY
Smith & Phillips Mfg. Co., Chicago, Ill.

WOOD PULLEYS
Canada Machinery Agency, Montreal.

WORK BENCHES
Canada Machinery Agency, Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio

MORTON MOIST AIR DRY KILN

The Most Perfect Dry Kiln on the Market

The "Morton" has a reputation for drying oak, maple, birch and beech quicker and better and with less steam than any other method—excepting none.

Write for our New Catalog "W"

Morton Dry Kiln Co., Chicago, Ill.

Furniture and Show Case Manufacturers and Builders

ATTENTION

We carry in stock a full line of Hardware Specialties for the manufacture of Show Cases, Counters etc., Furniture and Cabinets, Sash and Doors.

Our Catalog illustrates our numerous specialties and is complete with prices. Send us your name and address so we may send you one. We can very probably save you money on your present purchases.

The Reflector & Hardware Specialty Mfg. Co.
Western Ave. and Twenty Second Place, Chicago, Ill.

Our Specialty

The **Sheldon** Shaving Exhaust Fan for Planing Mills, is without a doubt the finest on the Canadian Market. It has a saving in Power and Speed of 25% to 40%.

All our Fans are thoroughly tested before leaving the factory; and results guaranteed.

We also manufacture Lumber Dry Kilns, Cars, Heating and Ventilating Appliances, Steam Specialties, etc.

Send for Catalogue

SHELDONS LIMITED - Galt, Ont.

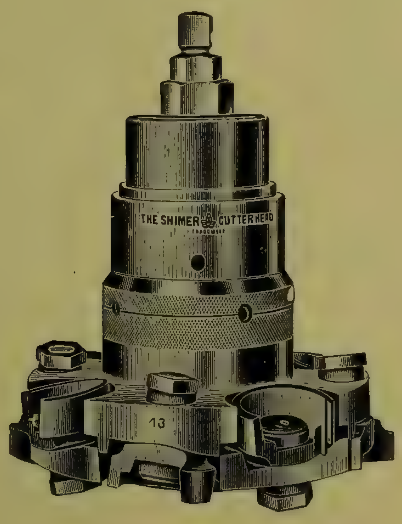
Toronto Office, 609 Kent Building

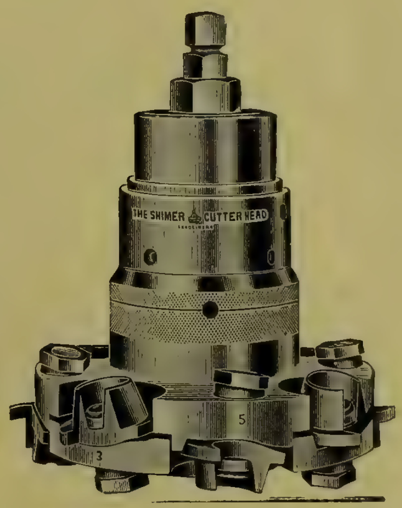
— Agents —

Grose & Walker, 259 Stanley St., Winnipeg.
Ross & Greig, 412 St. James St , Montreal.
Robert Hamilton & Co., Bank of Ottawa Bldg., Vancouver.
Gorman, Clancey and Grindley, Ltd., Calgary and Edmonton.

Every Hour Saved

By the Use of The Shimer Limited Cutter Heads





Adds to the capacity of your mill. These Heads are built especially for the High Speed Matcher and will tongue and groove flooring at 150 to 170 lineal feet or more per minute.

They are self-centered on the spindles by means of a chucking device which grips firmly thereto when drawn up, insuring all the cutters doing their share of the work and removing the objectionable set screw which has hitherto been used for fastening purposes.

The Bits carry a larger areal surface and the Bit chambers are of greater depth to compensate for the new acute angle given to the Bits for greater relief to the parts coming into contact with the lumber.

Price, net, in solid section, complete for making flooring $67.00. With Expansion feature like illustrations, $72.46 complete.

SAMUEL J. SHIMER & SONS, Galt, Ontario, Canada

Volume Thirteen TORONTO, MAY, 1913 Number Five

Canadian Woodworker

Canadian Woodworker

Canada's Only Woodworking Paper

Published in the interests of Planing Mills, Saw Mills, Furniture and Piano Factories, Implement and Carriage Works, Boxmakers and Coopers, Carpenters and Builders.

The Circulation extends from the Atlantic to the Pacific and covers thoroughly all classes of Woodworkers in this immense territory.

Wooodworker Publishing Co., Limited

Nicholls Building Toronto, Canada

United States: E. J. MACINTYRE, 659 Peoples Gas Building, Chicago, Ill.

SUBSCRIPTION RATE.

Canada, United States, $1.00; Great Britain, Australia 4s 6d.; other countries $1.50 per year. Advertising rates on request.

Vol. 14 May, 1913 No. 5

Opportunities for Service

THE shop foreman and the superintendent who do not study the pages of the Canadian Woodworker miss an opportunity both to help themselves and to contribute something to the development and progress of their calling. A man who thinks nothing about the progress of the industry that affords him his living is concentrated entirely in self. He may know it all, but it is not likely. It is more probable that he is running in a rut—a one-job man.

No better evidence of the progress of a community can be found than in its representative papers. Take the broad field of engineering and one finds scores—nay, hundreds—of excellent journals that attest to the originalty and progressiveness of those who are working in that particular sphere. Take half-a-dozen trades and their excellent representatives in the journalistic field. We cannot think that the woodworking industry is any less progressive than the others and so we are proud of the position that we occupy as the only exclusively woodworking paper in the field. From now on we are confident that each succeeding issue of this journal will show marked improvement on its predecessor. The publishers of the Canadian Woodworker will continue to improve the paper until it is established as the general clearing-house of woodworking knowledge.

All that we would impress upon the reader is that his co-operation is essential. The co-operation is not difficult to put into practice. We do not ask for any brain-racking literary effort. What we want is suggestions for articles dealing with practical topics of interest to the superintendent, the foreman and the machine man; we want photographs depicting actual operations in the shop and in the yard; we want to know the latest shop "kinks," the last word in the improvement of machinery; and last, but not least, we want to have the opportunity of taking part in the solution of individual problems when they arise.

We make a strong plea for co-operation. By this we do not mean the co-operation of the "other fellow," whoever he may be. We want the co-operation of the reader. We want to interest **you**—to keep **you** interested and to give you the best trade journal service in the world.

Assuming that you wish to have a part in promoting the interests of the woodworking industry, we ask you to read this paper carefully and to study the advertising as well as the editorial pages. Many an advertisement contains more practical information than a text-book.

The best trade journal service in the world may seem a tall order, but it is like many a practical problem in the shop—not so difficult when you know how to go about it and you've made up your mind.

Advantages of Electric Drive

THE application of electricity to woodworking machines is the subject of an extensive, illustrated article in this issue. No apology is made for the space devoted thereto, for the material has been selected with the greatest care and from many standpoints will repay careful perusal. The article deals with the advantages of electric drive, giving cost and other data. The disadvantages of steam drive are discussed, while other matters entered into are the source of supply, load factor, and the type of motor to use.

In making the assertion that motor drive has an outstanding claim upon the woodworker we do so having in mind many satisfactory installations which have reduced the old methods of drive, with their long lines of shaftings, pulleys and belts, to an economic absurdity.

Much has been said about the advantages of electric motors, but although we have covered the main points still more could be written. Electric drive reduces unit cost and makes for improved quality of the product. In the operation of woodworking machinery one is dependent upon a drive capable of transmitting even and constant torque to the cutting tool. The electric motor, which maintains a practically normal speed, meets the requirements. In addition to an improved product one must consider the advantage of increased output due to the systematic arrangement of the machinery. The individual motor drive or combined individual and group drive makes possible an arrangement of machines which secures the greatest possible output with any good equipment of floor space, machines and men.

There are many other points in favor of electrical operation. Of these, mention might be made of the speed of handling stock, flexibility of power, lessened danger to workmen consequent upon the elimination of shafts and belts, reduced fire risk, and the economical operation of individual machines or plant sections.

The article is based upon practice rather than theory and it is presented in the hope that it will provide a fund of useful information and elucidate many difficulties that should have little or no place in the consideration of an electrical installation.

The men who have achieved success are the men who have worked, read, thought more than was absolutely necessary, who have not been content with knowledge sufficient for the present need, but who have sought additional knowledge and stored it away for the emergency reserve. It is the superfluous labor that equips a man for everything that counts most in life.

Electric Drive in Woodworking Plants

Practical Discussion Designed to Show Advantages over Steam Drive—Application of Motor to Various Machines—Operating Costs — Load Factor — Individual and Group Drive — Type of Motor

IT is the history of almost every established industry that the tendency to conservatism has had more or less of a retarding effect on the general progress of that industry, which has resulted in the introduction of competition, foreign or otherwise, and a consequent reduction in profits without any coincident advantage to the consumer. In the past decade this piece of history has been repeated over and over again by the failure on the part of many manufacturers to grasp the significance of the introduction of electricity. Fortunately the advantages are so evident and far-reaching and the spirit of the present day so progressive that any losses incident to delay in the installation of motor drive have been speedily recovered. This is readily borne out by the experience of plants where the change has been in effect some time and any statements in the following article are based on such actual experience rather than on the theoretical arguments of the salesman of electric equipment or current.

In the woodworking industry the arguments in favor of motor drive are probably stronger than in any other line of comparatively small unit products. This is largely the case because the individual machines operate for comparatively short periods at comparatively long intervals. It has been calculated that the load factor in some woodworking plants is not higher than 6 per cent. By load factor we mean the percentage over a given period of time that the actual amount of power used is of the actual capacity installed; for example, if a certain factory has 100 h.p. installed in

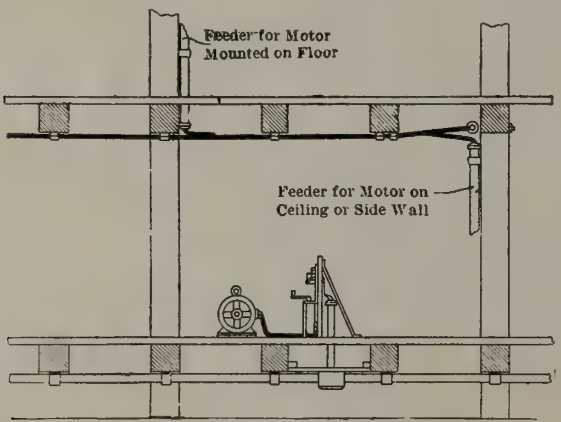


Fig. 1. Motor arrangement in woodworking plants.

motor capacity and uses only an average of 6 h.p., this would be called a load factor of 6 per cent. Added to this the loss in shafting friction, belt slipping, etc., where steam drive is used, is very great and amounts to, often, 50 per cent., and cases are on record where as much as 90 per cent. of the total output has been lost in this way. With the use of motors, not only is the line shafting practically done away with, and entirely so if individual application is made use of, but in addition the motors driving machines which operate only intermittently cost nothing, for current, when the machine is not working. In the following article the advantages of electric drive are amplified, the cost of operation is discussed at some length and a few of the applications of electric motor drive to the various woodworking machines are illustrated. Two of the figures also illustrate the method of installation of electric motors showing, in addition to the other advantages, the high factor of safety obtained from such an installation.

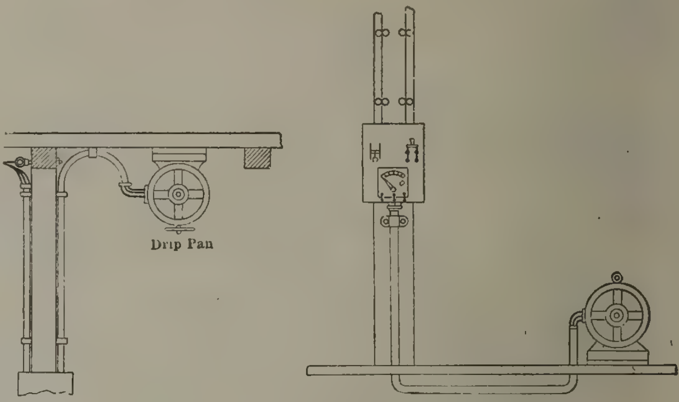


Fig. 2. Motor arrangement in woodworking plants.

Woodworking plants may be taken to include saw mills, planing mills, carriage works, piano factories, furniture factories, sash and door works, chair works, casket works, veneer and basket works, box factories, etc., each using machines adapted to their own special conditions and each machine requiring some form of driving power. In all of these there is the common characteristic however, that they operate intermittently, the only real variation being that some machines are idle longer that others.

Disadvantages of Steam Drive

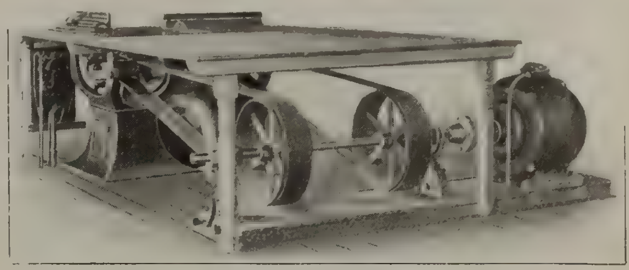
As already mentioned the loss of power where steam operated line shafting is used, driving individual machines by long belts, is a very considerable item. In addition to this loss there is the inconvenience arising from the narrow range of choice in placing the machines in relation to this line shaft; there is the difficulty of obtaining the necesary variable speed for the different machines; there is the loss incident to the operation of the whole shaft when possibly only one (or none) of the machines may be in operation; there is the unsatisfactory speed control resulting from the throwing on or off of any individual machine or from a change in the load on any individual machine; there is the added danger to the operator due to belts, etc.; there is obstruction to light, and the lack of economy in space; there is the increased fire hazard due both to the proximity of the steam plant and to the heating of bearings; there is the eternal wear and tear at every point of the system; there is the difficulty of adding more machinery or larger units; there is the increased staff necessary for the operation of such a system, there is the space required by the power equipment. Every single objection outlined above is over-

come, or relieved to a very great extent, by the application of electricity.

It may be well, perhaps, to point out also that electricity is valuable in the woodworking plant, not only for purposes of driving motors, but also for heating and lighting. In heating, its application is probably best known in connection with the glue pot, but the advantages of correct illumination in any kind of woodworking plant can scarcely be over-estimated. There is the added safety to the operator and to the machine he drives. The health of the operator is better and as he works under more favorable conditions he turns out more and better products. At the present time with the modern tungsten lamp and the efficient reflectors that have been placed on the market, there is no reason or excuse for a single poorly lighted machine or corner throughout the whole factory. This point cannot be too strongly emphasized. When one considers the cost of properly lighting a factory as compared with the cost of even the operators' wages alone, the former is almost insignificant and is paid for many times over by the improved quantity and quality of the work.

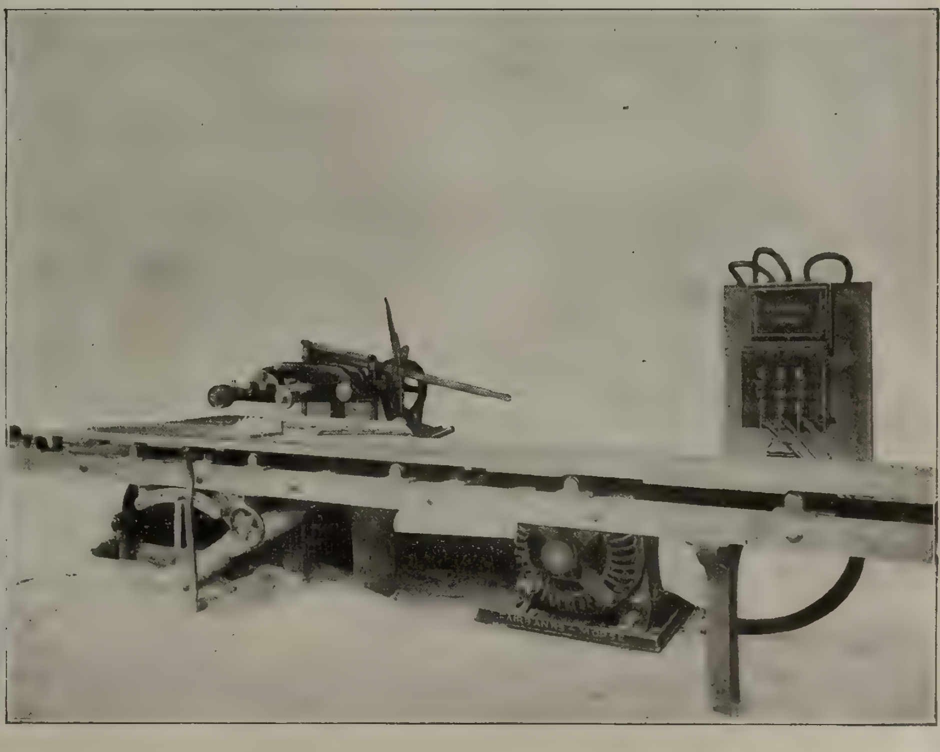
The question will generally arise in a factory of fair dimension, whether, having finally decided to install electric drive, it will be better to put in one's own generating plant driven by steam, gasoline or gas or whether it would be wiser in the end to purchase power from a supply company. While many factors will enter into the consideration of this subject we believe that, in general, the argument can only result in the adoption of central station power. The expense incident to the installation of a private plant is considerable and it must always be remembered that this capital is tied up whether the plant is operating or not and the majority of the maintenance charges run on twenty-four hours a day, 7 days a week, the year round. Neither is there the incentive to look into unnecessary uses or waste of power. Further the central stations are nowadays establishing auxiliary plants, which insure continuity of service, and are giving their power customers such low rates that it is becoming increasingly difficult to justify the installation of an isolated plant. Added to all the other arguments is that of the very low load-factor in the woodworking industry. The installation of a 100 h.p. generating equipment for an average of 6 h.p. requirements will not appeal to many as a business proposition and

1 h.p. C.G.E. motor operating 6-wheel grinding set.

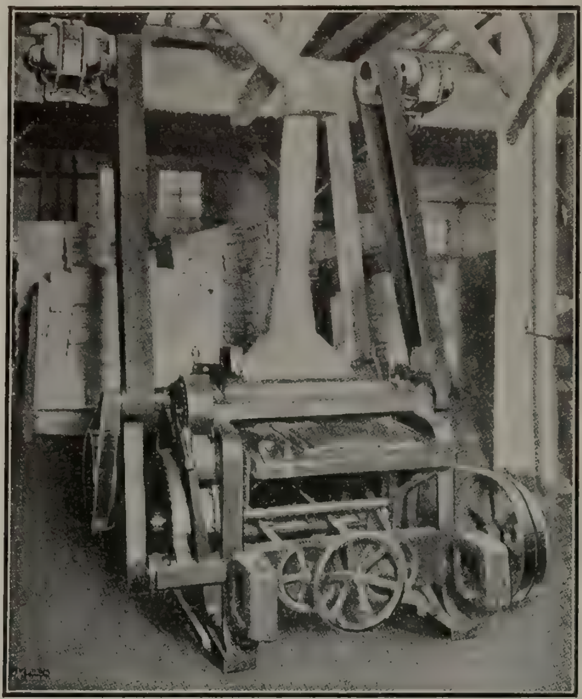


Holtzer-Cabot motor driving circular saw.

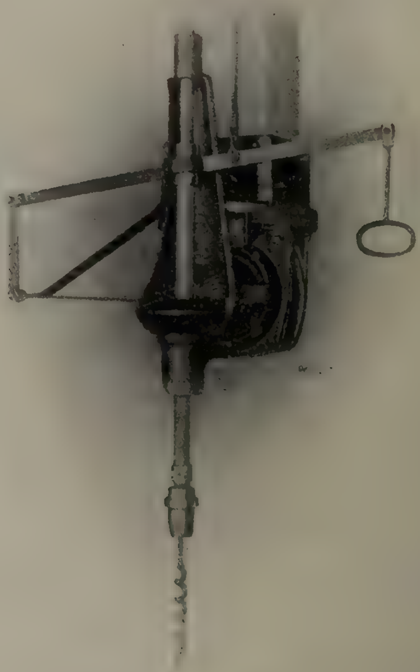
1 h p. Mechanical Appliance Co. motor driving 6 inch motor.



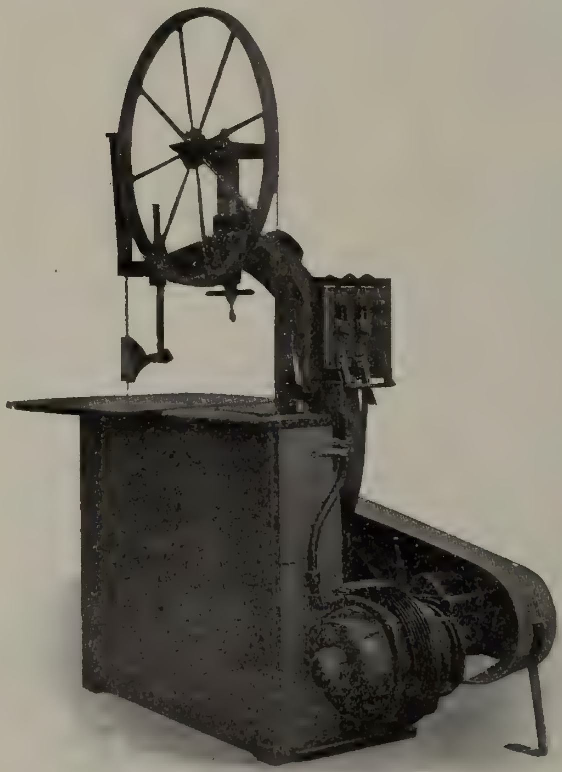
20 h.p. Fairbanks-Morse motor driving 20 inch self-feed rip and chamfering saw.



2-5 h.p. C.G.E. induction motors driving 30-in. planer.



2 h.p. C.G.E. induction motor driving wood boring machine.



5 h.p. C.G.E. induction motor driving band saw.

2 h.p. C.G.E. induction motor driving jig saw.

especially is this true when the low rate at which that 6 h.p. can be purchased from an outside company is considered.

Load Factor

It will perhaps come as a surprise to many to learn that the woodworking industries are not looked upon with particular favor by central stations nor is the business of woodworking establishments sought after as keenly as is that of some other kinds of manufacturing lines. This is largely because, as mentioned above, the load factor of any kind of woodworking factory machinery is apt to be very low, which means that while the central station must always stand ready to supply the full amount to the installed capacity they are only going to be paid for a small percentage of it. What this load factor is depends largely on the number and type of machines installed. For example, figures obtained in connection with a motor-operated wagon works showed from 6 to 9 per cent. average use of the total power capacity installed. A finishing factory showed from 4 to 6 per cent. Three other plants ran from 20 to 50 per cent., largely by reason of the continuous operation of shavings collectors and machines turning out standard products. A compilation of average figures recently published by the N.E.L.A. gives the following: woodworking (general), group, 18 per cent.; woodworking (general), individual, 6 per cent.; woodworking, furniture, 28 per cent.; woodworking, box making, 10 per cent. The saving with individual drive is very apparent here. To offset this there is, however, the added original cost of a greater number of motors.

Westinghouse 5 h.p. vertical induction motor belted to single spindle shaper.

Westinghouse 3½ h.p. d.c. motor driving door clamp.

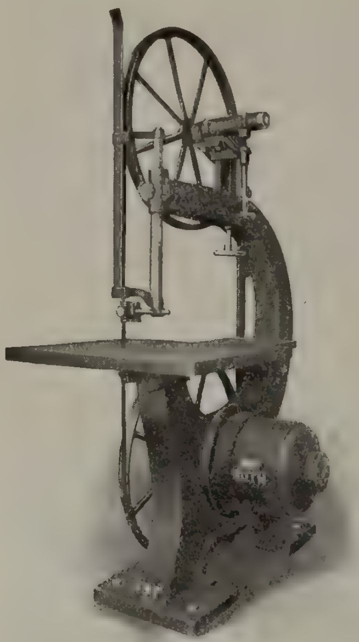
Individual or Group Drive

The figures just quoted above indicate a reduction in cost in the ratio of 3 to 1 by the use of individual drive instead of a group arrangement. It becomes a matter, therefore, of comparison between the original extra expenditure and the consequent added saving. The choice will depend upon local conditions, service requirements, etc. In shops requiring a considerable amount of bench work or where only a few standard parts are produced in quantity the best solution is often found in a combination of individual and group arrangements. Where single machines are but rarely used and where a reasonably constant load is anticipated, individual drive will generally be advisable. On the other hand, where it is improbable that all the machines will be loaded at the same time, and yet where frequent service is required of each of them, it is often of advantage to group a number of machines by belting them to a short line shaft driven by one motor; an added advantage is that the capacity of this one motor may often safely be not more than half the aggregate ratings of the machines in that group.

The ease with which adjustments and changes in the arrangement of the machinery can be made is somewhat sacrificed by the use of group drive. One of the outstanding advantages of motor drive arises from the flexibility of the system allowing any machine to be placed where it will be most out of the way or where it permits of the best sequence in the manufacture of the article in connection with which it performs a certain duty. The following table is submitted as representing the average condition, which, however, will of necessity change with the different conditions found in different plants. The table also indicates the size of motor which is considered best suited to the particular machine to which it is attached.

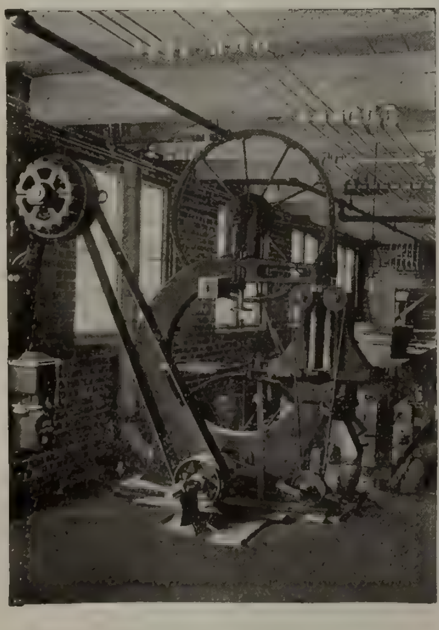
The Actual Cost of Power

The actual cost of operating a woodworking plant cannot, of course, be determined before-hand, as it depends largely on the management, on the care with which power is conserved and on other items over which neither the manufacturer of the electric motor nor the company supplying electric current have any control. It is possible, however, to form an estimate of what the cost should be under efficient management from the facts already given in this article. Suppose, for example, that a woodworking plant contained approximately the motor equipment outlined in our previous paragraph or (say) 160 h.p. Suppose again that the load-factor is 10 per cent., which means that the factory will pay for a continuous load of 16 h.p. 16 h.p. is the equivalent of 16 x ¾ equals 12 kilowatts. For a 10-hour day this will mean 120 kw. hours. At a 2c rate this is $2.40 a day for current cost. While this perhaps represents the re-



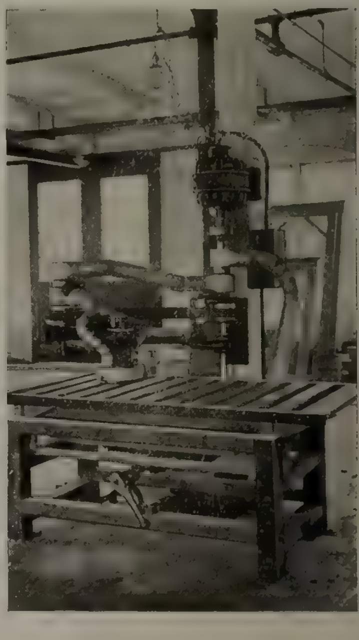
Small Roth Bros. motor operating band saw.

½ h.p. Robbins & Myers d.c. motor driving 12-in. speed lathe.

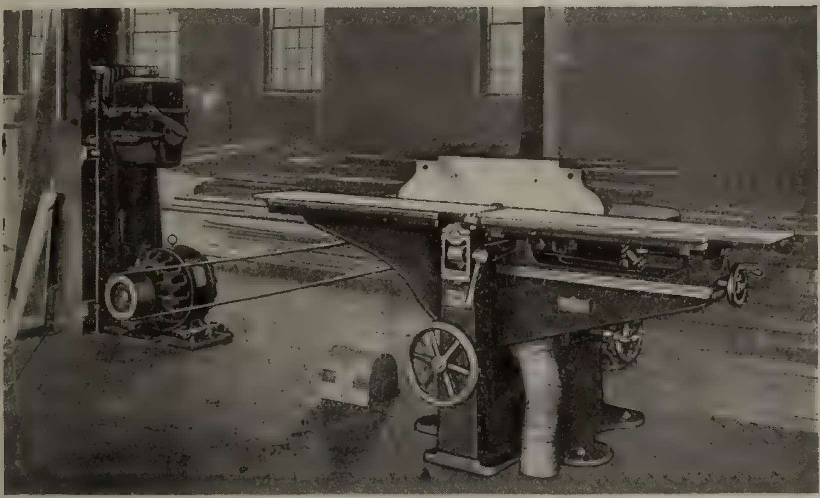


10 h.p. Westinghouse induction motor driving band resaw.

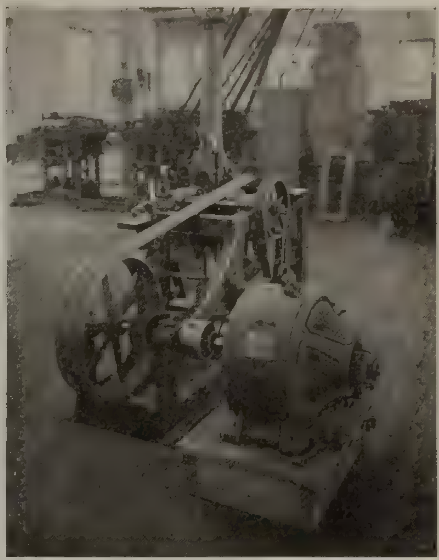
Westinghouse 5 h.p. induction motor driving 8-in. moulding sander.



Westinghouse 2 h.p. vertical induction motor driving post sander.



Westinghouse 7½ h.p. induction motor driving 9-in. universal wood worker.



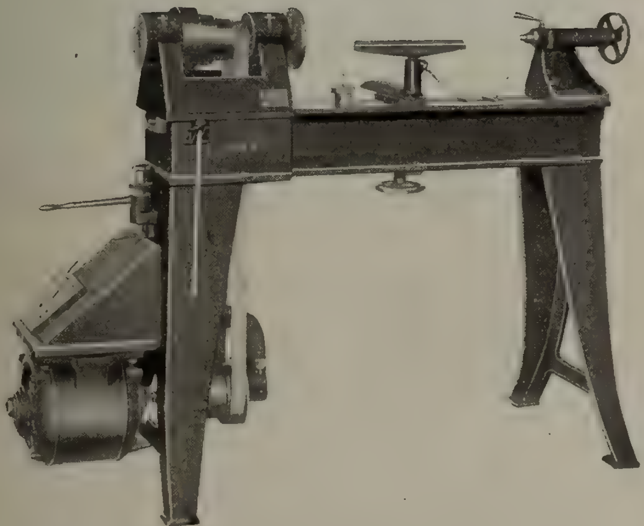
Westinghouse 3½ h.p. d.c. motor coupled to 6-in. sash sticker.

quirements of a large factory, the cost in larger or smaller plants would work out in about the same proportion. In any case it is seen that the actual item of current cost is almost negligible in proportion to the numerous advantages following its use.

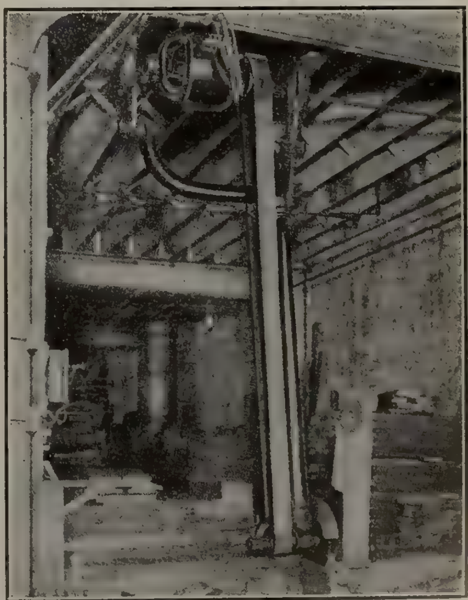
Type of Motor to Use

A large percentage of woodworking machines are required to operate at constant speed. For this reason if alternating current is available, it is better to install alternating current motors, as they are somewhat simpler in construction, and it is one of their characteristics that they must operate at a constant speed. Further than this the induction and synchronous types of motor do not require a commutator (that is, a moving contact) and the danger of sparks from this cause is thereby avoided. This is an especially valuable consideration when the motors are operating at points where there is any fire risk. It is true the modern motor specially manufactured for this type of work is so designed and enclosed as to remove practically all fire hazard, but where so much is at stake, it is well to be doubly safe. A further advantage in the use of alternating current motors is that they are capable of carrying heavy overloads for considerable periods and possess a remarkable ability to withstand violent momentary peak loads, a condition often met in the woodworking industry.

Where alternating current is not available or where adjustments in the speed of any machines are required, direct current motors will give excellent results. There are now on the market several makes of d.c. motors which insure freedom from sparking, give a low maintenance cost and combine the ability to



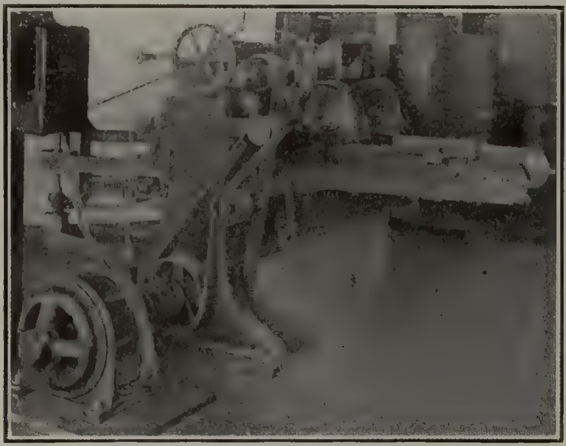
½ h.p. Century motor operating wood turning lathe.



d.c. motor driving swing saw.

secure a wide speed variation with excellent overload characteristics.

In these days of building congestion and high power rates, it becomes a matter of great importance whether we pay the highest rate chargeable by insurance companies on old wooden structures, or the lowest rates obtainable under modern conditions of fireproof construction and safe motor equipment. As already pointed out, if power is obtained from a steam plant and the machines operated by shaft drive the fire risk is great and the insurance rates correspondingly high. With electric current purchased from an



10 h.p. C.G.E. motor driving tenoning machine

outside company the danger from an adjoining power plant is removed and with it the possibility of overheated journal boxes and spontaneous combustion of accumulated oily waste or shavings. As between a rate of (say) 5 per cent., not uncommon on old wooden buildings, and (say) 1 per cent., easily secured under modern fireproof conditions, the saving is very large. The following comparative figures appear to be conservatively compiled:—

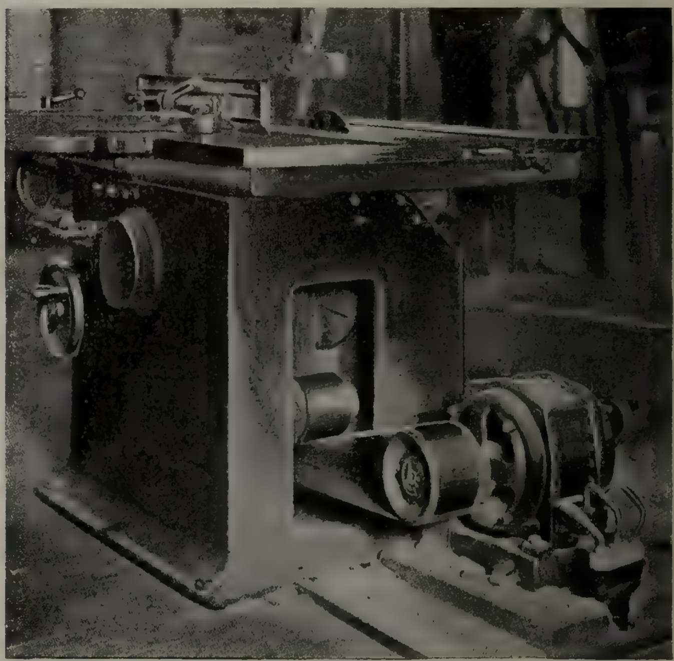
	Cheaply Constructed Wooden Buildings	Best Fireproof Construction
First cost of woodworking machines	$ 5,000	$ 5,000
Buildings	6,000	10,000
Sprinkler System		2,500
Pumps, Heating, Drying Kilns	3,000	3,000
Line Shafts, Belts and Pulleys	3,800	
Engines and Generators	1,000	2,800
Motor Control, Wiring, Switchboard		5,000
Stock lumber and unfinished work	10,000	10,000
Total investment liable to loss by fire	$28,800	$38,300

Insurance premiums—	
$28,800 at 5 per cent.	$1,440
38,300 at 1 per cent.	383
Saving in annual premium	$1,057

The neater appearance and the added factor of safety introduced in the woodworking factory by the use of motor drive is well exemplified in the two line drawings shown herewith. In Fig. 1, upper storey, a method of installing the feeders is shown, which in this case is a combination of metal conduit and flexible insulated cable. The outlet in the upper storey is designed to feed a motor on the floor or wall as required, or in both positions if necessary. The lower outlet is designed for either a ceiling or a wall motor, or both. The floor motor shown in the figure represents the neat appearance of such an installation and the small space required by the motor and its control equipment. This motor, it will be seen, is fed from a conduit run below the lower floor. In this case no flexible leads are shown as, being under the ground floor, and, as such, less easy of access for repairs, and also more liable to deterioration, dampness, rodents, etc., metal conduits are used throughout for greater protection and safety.

In Fig. 2, to the right, a still simpler arrangement of motor and control is shown. In this case the switches and starting equipment are installed on the wall or on one of the supports of the factory and do not take up any useful space. In this case all the wiring is in metal conduit, the wires leaving the switchboard and being led down the side of the post or wall under the floor and up again through the floor at a point close to the base of the motor. In this case the minimum of space is required for a motor installed on the floor. To the left of Fig. 2 is shown a motor operating from the ceiling. The same switching and starting arrangements would be required, placed in the same way as shown to the right of the figure, but the leads in this case travel upwards to the ceiling.

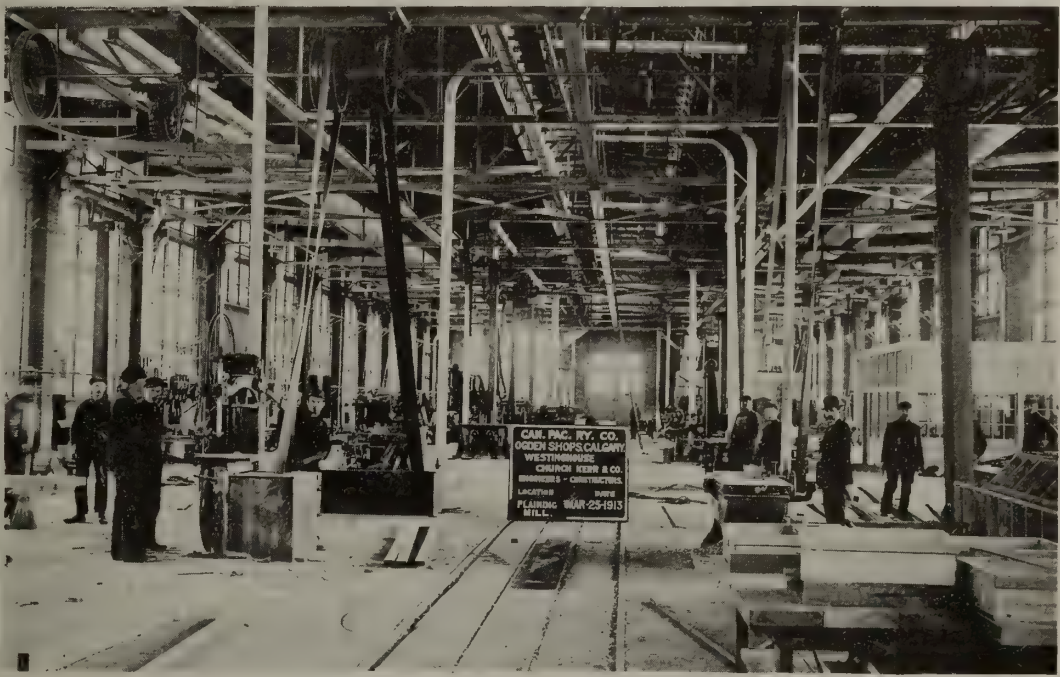
In the most modern equipments metal conduit is the most approved method of installation throughout. The extra cost is not very considerable, the appearance



5 h.p. C.G.E. induction motor driving 12-in. rip saw.

is exceedingly neat and the wires are removed from all possible danger of contact or collection of dust or moisture.

Perhaps the most frequent trouble with brushes, for which the manufacturer is often blamed, is the curling of the bristles. In many instances, this is no doubt the maker's fault; the bristles not having been cured properly. In good brushes the most common cause for curling is the manner in which the brush is wiped and the way it is put away for the night. If the brush is wiped across the points of the hair, the outside hairs are bound to straggle. A brush should be wiped just to the ends of the bristles and not so that the edge of the bucket will catch the outside bristles constantly bending them outward until they assume a contrary position from that intended.



Interior of planing mill, C.P.R. shops, Ogden, Alta.

The C.P.R. Planing Mill at Ogden, Alta.

At Ogden, Alta., near Calgary, the Canadian Pacific Railway have recently put into operation a large shop plant of more than ordinary interest by reason of its size, its complete and modern character, and the speed with which it was erected.

Of the many noteworthy features, we are concerned particularly with the planing mill, a view of which is shown herewith. This building is 303 feet long by 80 feet wide and contains the woodworking machinery. The frame is of structural steel carried on concrete footing and the general construction of the building is the same as that of the other shop buildings. A track extends through the building longitudinally. To facilitate and minimize the handling of material, the building is located so as to be convenient to the car shop and the freight car shop. The lumber yard is located at the back of and at one end of the planing mill. Suitable piping has been provided for distributing compressed air and water. The fire protection system includes automatic sprinklers. A special feature of the plant is the excellent sanitary arrangements.

Every provision has been made to facilitate the operations of the work. The building is excellently lighted, the location of the machines has been carefully planned and the material is tracked in at one end of the building and out at the other with practically no delay. Metal lockers are provided for the men employed in this department.

The heating is by the indirect fan system, with galvanized heating ducts. The lighting is by the mercury vapor system. The buildings were designed and erected by Messrs. Westinghouse, Church, Kerr & Company, of Montreal and New York City, under the direction of Mr. J. G. Sullivan, Chief Engineer of the western lines of the C. P. R.

Ogden is named after a vice-president of the railway. It is situated 4½ miles from Calgary and 2,250 miles from Montreal.

To Remove Discoloration

Experiments with stains have often the annoyance of a temporary unsightly discoloring of the hands. Numerous methods of overcoming the evil have been suggested. One of the latest of these comes from a German source.

A jar is placed in boiling water, and 1 ounce of white wax, cut up into shreds to facilitate melting is placed in it. When the wax has melted, about 50 grams weight of olive oil is added, and after thorough mixing, the mixture is allowed to cool. The fingers should be dipped into the mixture when it is nearly cold, and they are then protected by a thin layer of wax, which prevents the chemicals getting to the skin.

The coating of wax does not interfere with the freedom of the fingers, as rubber coverings do, and the wax may easily be cleaned off with hot water and soap, after it has served its purpose.

British Columbia contains no less than one hundred million acres of forest lands, containing over three hundred billion feet of timber.

The Period Styles in Furniture Making*

An Indianapolis Boy's Essay, Showing the Kind of Knowledge Which is Required of Students in Some Industrial Schools

By M. Y. Oilar

THE history of furniture in those countries where it can be traced follows closely the character and customs of the people, and corresponds to the skill of their workmen and the use of improved tools. It may be here noted that all Period styles have a history that can be traced back many centuries and, in most cases, this history is exceedingly interesting. In writing about Period styles in furniture, I will start in with the earliest known period in which furniture was produced, and trace the advancement in English and American furniture, as these two countries have made the best progress. There are few historical pieces of furniture now in existence, but an exact likeness of many of these old pieces has been reproduced. The different styles in furniture are usually given the name of the sovereign under whose reign they developed, but there are, however, some few exceptions to this rule, when the furniture was named after the designer. The classification of the styles is somewhat extremely difficult, as there is no distinct line drawn between the different types. One really leads into another. In the early days, the furniture followed closely the architecture of the day. This is especially the case with the Egyptian, Roman and Grecian furniture, if it may be called furniture. Since their chief building material was stone, there was very little real furniture produced. Practically all of their houses, as well as their furniture, was made of stone, consequently they were very skillful at carving. These three styles are practically all the same, although each one has a slightly different detail. The Egyptians made seats, chests and stone tables principally. Many fine specimens of Roman art were found in 1748 when the buried cities were discovered. These people, although not very far advanced in the art of designing and making furniture, established the principles that were later worked out in detail by the famous furniture workers.

Moorish Designs

Some few years later, when the Moslem power spread abroad, a new style, known as the Moorish, developed. Since the Moslem religion prohibited the use of human or animal forms in painting or decorations, their art was chiefly confined to vegetable and geometric ornament. These people were very skillful in interweaving these ornaments together. The Gothic style, which is really under the Moorish style, first appeared about 1200, and quickly spread over all Europe. This style, as well as the former, was chiefly architectural and not much furniture was produced. Cupboards, chests, tables and beds were the principal pieces of furniture made. The chairs, with the exception of the folding stools, were massive and uncomfortable. The Moorish and Gothic styles are really another link in the making of the many styles in furniture.

The Original Mission

The Mission style, which may be classified as the next Period style, is probably the next most important period in the history of furniture. This is so because the material was changed from stone to wood. It derived its name from the fact that old Missions were established by the monks of the order of St. Francis, in the sixteenth century. All the orders of the Catholic Church arrived in the United States and commenced work in 1522. They built old Mission bridges, as they were called, and furnished them to the best of their ability. They made all of their own furniture, and out of the handiest wood. Since the tools used in those days were very crude, these monks naturally made their furniture in the simplest possible manner. They covered their chairs with the skins of animals that they killed. This concealed the irregular marks of the axe. These pieces of furniture, although very primitive in a way, were made very useful.

Furniture of the Elizabethan Period

The furniture made during the reign of Queen Elizabeth is commonly called Elizabethan furniture. The styles in English furniture were gradually changing, due to the condition of the country at that time. The workmen that had been brought over from Italy had not yet attained that delicacy of design and skill that had characterized their former styles. However, they developed a sturdy, substantial style that was especially suitable for oak. All of the furniture was of a heavy, massive construction, having large fluted columns. The carving was very coarse and flat. The furniture produced was mainly chests, tables and massive beds. Chairs of a stiff, uncomfortable nature were used. Although upholstering had not come into use to any great extent, there were a few loose-cushioned seats made for the chairs. It may be especially noticed that all the furniture made in this period was very large and correspondingly very solid and stout.

The Jacobean style in furniture, which is very similar to the Elizabethan style, came into use in 1603. This period is sometimes known as the Stuart period, being named after that family. There is really no distinct line drawn between this style and the Elizabethan, because practically the same ornamentation was used on both. Some of the later Jacobean furniture became quite plain, although turned legs and supports were popular. Most of the carving was cut into solid wood, instead of being glued on. Most of the chairs had cane backs and seats with a slight bit of inlay. Since oak was the favorite wood used, the furniture could be matched very easily. Some few choice pieces that were used in this period have been scattered here and there among mansions of nobility.

The Dutch School

When Mary and her Dutch husband, William of Orange, ascended to the English throne, Dutch influences naturally became strong in furniture. Many of the people belonging to the court were Dutch, and brought most of their furniture over to England with them. The English workmen copied and revised the designs, and gradually this William and Mary style developed into a good, classical type of furniture. The ornaments used were very simple, and this, together

*Copyright. Reprinted by courtesy of The Furniture Manufacturer and Artisan.

with the Dutch inlay, made very beautiful furniture. The principal woods used were oak and walnut. The furniture was stained an antique brown, which made a fine background for the old gold inlay. One of the most noticeable features of the style is that all the furniture has turned legs and curved underframing. Many unique and interesting pieces of the furniture in this period are kept at Levens Hall, Westmoreland, for exhibition. The William and Mary type was really the beginning of the Queen Anne style, but it had some distinctive features that placed it in a class of its own.

Anne, the daughter of James II., gave great encouragement to the style developed during her reign. This type, with the exception of the William and Mary style, was a complete change in English furniture. The chairs that had previously been stiff and uncomfortable, were now made to fit the human body. Upholstering came into use very extensively and was of an Oriental design.

One of the distinctive features of the style is the use of the cabriole leg, which was first plain and later carved. The heavy cabinets, made generally, had a low and sturdy cabriole leg, while the tables and chairs had tall and slender legs. This style of leg was first introduced by the Dutch traders from China, where it had long been in use. The hoof, ball and clawfoot were used, and they also originated in China. Veneering was almost extensively used, with some inlaying. The principal wood was walnut, although later a large amount of mahogany was used. The Queen Anne style predominated from the reign of William and Mary, to the end of the reign of George the Second, and was generally conceived to be a fine style.

The Georgian Period

The Georgian period of furniture is known as the Golden Age of English furniture, because many fine styles originated then. Thomas Chippendale was the first designer to impress his personality in his work. The style of furniture known as Chippendale, was named after him. Although a carver at trade, Chippendale went in business at St. Martin's Lane, London, and designed furniture. His chairs stand as his greatest work, as they are noted for their beautiful proportion and delicate carving. Most of the chairs are slip seats. All of his designs were more or less a combination of Gothic and Chinese detail. Chippendale used Spanish mahogany of a deep red color in nearly all his furniture. It was finished in beeswax and rubbed well until it gave an old red brown luster, which was in harmony with the style. Heppelwhite was the next man to gain fame in furniture designing. His designs were of a severe, straight line and classic nature. His chairs all had shield backs, with square tapering legs, and very often the Prince of Wales plume was used as an ornament. Upholstering and cane were both used. The popular wood was mahogany, similar to that used by Chippendale. These two were not only convenient and serviceable, but were extremely beautiful.

The English Masters

The Adam and Sheraton types were the next two styles in the Georgian period. R. and J. Adam were the two designers who first introduced into England an extremely dainty type of classical furniture.

Their designs were greatly appreciated at that time by the nobility. Their styles were somewhat on the order of the Greek and Roman furniture, having that characteristic carving. All the ornament used was made in low relief, being mostly carved. The Adam brothers also used inlay, painting and gilding. Their chairs, tables, and so forth, were usually square or round, fluted and tapering. Large wooden urns were usually placed at either end of their sideboards or buffets. They used flowered borders and decorations to a great extent on all their furniture. Some of the Adam designs were taken to America and blended with the later Colonial pattern, and this design was known as Adam Colonial. The demand for this style of furniture was very great in that day, and still remains so. Thomas Sheraton, one of the world's greatest designers, has been called the master of cabinet making and inlay work. He was not a manufacturer, as were Chippendale and Heppelwhite, but devoted most of his time to designing. He used very little carving, and that which he did use was strictly conventional. Like the few former styles in the Georgian period, Sheraton followed straight leg, usually fluted and tapering, all of which harmonized with the style very well. The majority of his chairs were rectangular backed, with slightly curved and broken top rails. Sheraton was the last of the eighteenth century designers to leave a style bearing his name, and he is conceived by many to have been the greatest of them all.

Colonial Furniture

The Colonial period, which was originated in the United States in 1607, is another very elaborate style. It derived its name from the fact that it was brought forth in the old Colonial days. Various influences of European styles made this type a very artistic style. Mahogany, with a finely-figured veneer, is the wood that is mostly used. The most distinguishing point of this furniture is that it all has a large, classical column, sometimes in the shape of an S, and sometimes plain and round. The Colonial style is usually of a heavy construction, and is easily recognized. The Colonial pattern is today a general favorite among all people, and may be found in many homes.

During the past few years a style has originated in the United States known as the late Mission style. This style differs little from the early Mission type, except that it is more advanced in style and proportion. It was at first extremely clumsy, but recently the style has been lightened and greatly improved upon. It is all plain and straight, having a square, box-like effect. Since the Mission is a simple style, it is very easily recognized. The wood that is used is mostly oak, although some mahogany is made to blend with the style. The oak is sometimes veneered and usually stained brown or black. Similar styles are being made in England, Germany and other countries, under the name of New Art, Arts and Crafts, etc. But at present the people are all seeking the Period furniture for use in the home, for they are just beginning to appreciate its real beauty and value.

KEEP to broad and sure lines, and study them to be certain that they are correct ones. Watch the natural operations of trade, and keep within them. Don't waste your effort on a thing which ends in a petty triumph unless you are satisfied with a life of petty success. Be sure that before you go into an enterprise you see your way clear to stay through to a successful end. Look ahead!—John D. Rockefeller.

The Changing Conditions Brought by Woodworking Machinery

THE work of the pattern-maker has been changing slowly for years, and will continue to do so as improved machinery becomes more and more commonly used for doing work which formerly demanded manual skill.

In a modern shop it is no longer necessary for a man to be able to plane a piece of wood true and square, or bore holes straight, or work curves and contours accurately with gouges, chisels, and planes, or even be very skillful in screwing, nailing, and gluing parts together.

Skill in the use of hand-tools was formerly regarded as the chief thing to be learned. Now it is of minor importance, and is likely to become less and less necessary.

Machines, Materials, and Methods

The time seems in sight when a patternmaker will be a man with no particular skill, but only with knowledge of what is required and of the machines which do the work. The work bench will become of less importance, and most of his time will be spent in operating machines and measuring and adjusting the wood.

Whether patternmakers will be reduced in number is perhaps uncertain, for increased rapidity of production may be counterbalanced by increased volume of work. There is one thing, however, which has already reduced the number of patternmakers proportionately to other trades in engineering work, and that is the greatly increased use of wrought-metal and plated work, stampings, and rolled sections, where castings used to be employed.

At one time, patternmakers and draughtsmen—the two unproductive classes, or necessary evils, in engineering—were about equal in numbers. Now there are perhaps twice as many draughtsmen as there are patternmakers.

America was rather ahead of Europe in finding that in many cases work could be done more profitably by a complete separation of the various departments, firms going in for one branch alone and supplying the work to order to other firms engaged in a different branch. Thus a firm may do nothing but patternmaking, and although it depends entirely on outside orders, it finds enough to keep a number of men employed steadily. It gets orders from firms that either employ no patternmakers or employ a few and put out some of the work, the advantage of the latter policy being that fluctuating quantities of work can be executed without varying the number of men employed.

A small general firm with a poorly equipped patternshop often finds it cheaper to buy patterns than make them. It finds it convenient when a substantial order can be put out, but there is generally a proportion of small and miscellaneous work which can be better done on the premises.

The specialist's shop is not always a well-equipped one. The large ones are, but the small ones are not. A patternmaker who finds he has ability above the average, and a small amount of capital, decides to set up in business for himself. He is perhaps already well known among small employers in a manufacturing district of a large town, and he rents a small shop there, with or without power for driving machinery, does all the work he can himself, and employs other patternmakers when the amount of work justifies it.

In larger shops the head does no bench work, and employs a foreman to do most of the supervision, his own time being chiefly spent in going about getting orders. Firms like these are constantly discharging and putting on hands as the amount of work in the shop varies. The leading men regularly employed in such shops have capabilities above the average, and the men without regular employment in the locality are known, and can be selected when wanted according to their ability.

Machinery and Modern Conditions

Machinery in the patternshop is making a great difference in the way the work is done. Some years ago, and perhaps still to a small extent, there were shops with absolutely no machinery of any kind for the patternmaker's use.

Even turning would be done in a machine shop lathe, and to avoid the inconvenience of this much circular work would be done by hand at the bench. All sawing would be done by hand, and the patternmaker would in consequence find it advantageous to have a ripsaw as well as the ordinary crosscut handsaw. Work was done slowly and laboriously compared with modern conditions.

The first, and still the most important, labor-saving machine was the power-driven saw. The circular saw came first, and for a long time was regarded as the most efficient and serviceable type, but the premier position has since been given to the bandsaw.

Before either was as highly developed as now, the circular saw was regarded as the saw for straight cuts and the bandsaw for curves. But the bandsaw has shown itself quite suitable for straight cutting, and is essential in the patternshop, while the circular is not. Jigsaws of reciprocating type were used for curves before the bandsaw was developed.

Joiners and other woodworkers find the circular saw more useful than patternmakers, because of the immense amount of tenoning, grooving, and rebating which can be done by adjusting the table so that the saw cuts to the correct depth.

Changes in Purchasing Materials

Planing comes next to sawing in the labor and extra time involved when it is done by hand. Besides this a great deal of skill is required to plane surfaces absolutely true and square with each other.

The first move in patternshops was to purchase boards already planed to thickness. This, however, still necessitated an immense amount of hand-planing, and it was not long before the advantage of having some kind of planing machine in the shop was found. These, also, have been much developed and improved, and are made in great variety for different classes and sizes of work, some being quite small motor-driven machines for use at the bench.

The invention of the rimmer for squaring ends was

a great advance, saving a great deal of chisel and plane work. Being a simple and cheap appliance, it was not long in making its way in nearly all shops, and in all but the smallest there are now generally a number of trimmers, so that there is always one within convenient distance of any bench.

Considerable improvements have been made in trimmers since they were first put on the market, though in principle they are precisely like the original —a knife-edge slicing the wood by a diagonal movement across it.

Patternmakers' lathes have been much improved, and some of the skill formerly required in turning has become unnecessary because of the provision in many of them for automatic travel of the tool as in metal turning. In some large and highly specialized patternshops, also, the man who does the turning does nothing else, and is not necessarily a patternmaker.

There are a large number of machines profitably used by other woodworkers which are not of great value in the small patternshop. Machines for boring holes would in the patternshop be used chiefly for screwholes, and as the patternmaker works chiefly in soft pine, and seldom has many holes at a time to bore, it would only occasionally be worth his while to go to a machine for the purpose.

Boring machines, however, are simple and cheap, and often boring is one of the functions of other machines of a combination or universal character, and there are plenty of instances in pattern work where such boring is preferable, for accuracy, as well as for saving time and labor to the hand brace.

Mortising, routing, and scraping machines are more useful in other trades. Sanders, to save time in glasspapering by hand, are useful, though less so to the patternmaker than to the cabinetmaker. Screwing and nailing machines are not much used in patternshops, though they are common enough in shops where such work is being continually done. Of the two, the machine for inserting screws is the more useful to the patternmaker.

In the use of glue there has been a very great change since the early days in patternshops, though here, also, it is other woodworkers who have been most affected. Almost every detail about it has been altered and improved, giving better results in less time and with almost no skill. The fitting of surfaces, of course, is not so frequently done by hand, but the gluing operation itself has been simplified, and good results insured almost independently of the workman. Glue heaters have been improved, and for large surfaces the glue is spread in a machine instead of by hand, the objection to hand work being that in large joints the glue gets chilled before the surfaces can be brought together.

Next to the proper and convenient heating of the glue and its quick application, the important thing is to press the surfaces tightly together and keep them under pressure for a few hours. Formerly this was done in more or less extemporaneous ways, often imperfectly, and sometimes not at all. Making and gluing large joints was hard, troublesome work, and results were generally imperfect in some way—perhaps obviously so, perhaps to an uncertain extent. Glue, therefore, was not trusted so much as it is now, and was never relied on alone for important joints.

The necessity for effective clamping of joints has resulted in a great variety of highly efficient clamps in place of the crude and slowly operated designs which years ago were generally made by the woodworkers themselves.

The accessories used in pattern construction such as dowels, fillets, pattern letters, etc., the making of which was formerly regarded as part of the patternmaker's work, are now generally bought ready-made.

Hand-tools have been improved, and are obtainable in greater variety; special ones have been added which years ago were either shop-made in a rough fashion or dispensed with.

Years ago it was thought impossible that machinery could ever do the patternmakers' work to the extent that it was doing joinery and other branches of woodwork, for in patternmaking there is not the uniformity and repetition that occur in most other trades. But machines known as mechanical woodworkers have been devised which will do just the work which seemed beyond the reach of machinery.

Given a radius to cut, or a definite section of any length, either straight or curved or a combination of each, whether hollowed out as in coreboxes or of salient contour as in pattern formation, these machines will do the work more accurately than by hand, and much quicker. They have revolving cutters, and the work is placed on a table which can be traversed and swung as required in relation to the cutter, the latter also having movements of its own besides the revolving one, and all movements are mechanical and precise.

Gearwheel teeth of all kinds can be cut on these machines, and in fact all work that used to be done entirely by hand with gouges, chisels, and planes. Small patternshops without such machinery are thus placed hopelessly out of competition, and can only exist by doing work on a small scale, and of too trivial a character to be worth sending to a better equipped shop.*

*By W. J. H., in Wood Craft.

Making Hand Saw Handles

By Samuel J. Record

IN making hand saw handles the thoroughly-seasoned lumber is planed down to an even thickness and then sawed into small pieces, generally of such size that two handles may be made from each of them. The markers then trace the shape of the handles with lead pencils around sheet steel patterns. They are then cut out by the band saws, after which a hole is bored in the center, through which the jig saw enters and cuts out the center piece. They are now sent to the "nosing" machine, where the nose is shaped. "Jimping" is the next operation. In this the roughly-cut handles are brought into contact with swiftly revolving cutters and the edges are rounded. The handles now pass on to the filers, who work them into the finished shape. This is followed by sandpapering on belt machines. The next step is varnishing, after which comes "slitting," as it is termed, or the process of sawing the slot in the handle in which the blade rests. In connection with this operation the handles are bored and countersunk for the bolts or screws. If the handle is to be carved, that work is now done, then follows polishing.

Apple wood is very well adapted for hand saw handles, being hard, of very fine and uniform texture, and capable of receiving a high polish, though of little natural luster. The deep, uniform color makes it attractive, and the trade has become so used to the wood

for the better grades of handles that none other is considered satisfactory. About 2,000,000 board feet are used for this purpose annually. It is mostly the product of old orchards which are removed on account of age or disease.

Apple lumber is sawed from butts which run 2 ft. or more in length, occasionally reaching 8 ft. long. Bolts less than 13 in. diameter are ordinarily not used, "for the reason," as a manufacturer explains it, "if the butt is smaller than that the wood is worthless for making saw handles, since a certain width clear of heart is required." Sometimes logs are shipped to the factories and sawed there. More often the manufacturer buys the material sawed into lumber from 6 to 6½ in. wide and 1⅛ to 1 3-16 in. thick. The length of piece required for a saw handle is 9 in.

When the timber is first cut it has a reddish-yellow color, and it is customary to subject it to a steaming process, which reddens and deepens the color and renders it more uniform. To secure the best results, the steaming must be done after the timber is cut and before the sap is dried out. This is accomplished by placing the green wood in a tightly-closed box or room and subjecting it to the action of live steam for a period varying from thirty-six to seventy-two hours, depending on the length of time the timber has been cut; the greener the material, the less time required in the steam box to get good results. After steaming, the lumber is piled in the open and air-seasoned from two to three years. Before being used it is placed in a kiln and thoroughly dried.

The price of apple wood is so high, however, that for the cheaper saws beech is a common substitute. What beech lacks in natural beauty and high polish is offset for general utility by its greater strength, toughness and vitality. Other woods used for hand saw handles are black cherry, red gum and maple, and, where specially ordered, black walnut and mahogany. Handles for long or cross-cut saws are principally made of beech and maple, though some few are of hickory.

Trouble That Developed With a Sander

By S. P. Smith

THE other day I went into a shop where they were certainly having a whole lot of trouble with a fine large three-drum sander. They couldn't get work through the machine without markings across the work about three-eighths or one-half inch apart.

That is, I mean, they couldn't get the work free from these markings for a considerable bit of time after new paper had been put on the drums, but finally things would settle down and the work came through smooth but not until after a considerable number of pieces had been run with the markings above mentioned.

Damage to Sandpaper and Stock

But, just after the sander got ready to cut smooth, snap would go the paper and a new sheet had to be put on and the same ceremony repeated, viz., the running of a lot of marked stock, then some perfect work, and a break in the sandpaper again. The thing finally became so monotonous, and so costly as regards sandpaper and damaged stock, that I was called into the shop for consultation.

It took but a very few minutes to locate a part of the trouble, but several hours' time was required to find all the trouble and to cure it. The first thing found, upon revolving the sander by hand, with a bit of chalk held just so as to touch the first or roughing roll, was the fact that while the sandpaper was fairly true at one end of the roll, there was a decided high place in the middle and at the other end of the roll. The paper was removed, the felt taken off, and the roll turned slowly by hand again, while the chalk was held in turn against each end and the middle of the roll.

It was found that there was a bend or kink in one of the journals, close to one end of the sandroll, between the end of the roll and the bearing. Fig. 1 shows the location of the bend, which was very slight, the roll running "out" less than 1-32 inch, but enough to cause great trouble with the finished product of the machine. Fig. 1 also shows the manner in which the shaft was straightened.

A piece of chain was found in the factory, and an eyebolt was welded into the chain as I have shown at B, Fig. 1. The end of the eyebolt was passed through a hole in the floor and the nut adjusted under the floor until the chain held the shaft loosely into the journal bearing and prevented the shaft from raising more than about half an inch when the bar D was used. Bar D, a common crowbar, was placed across a convenient "bait" and a pry taken under the sander shaft as at A.

Pressure was applied to bar D, sufficient to raise the shaft A an inch or so above the bearing, but not enough to give the shaft a set. That is, the pressure exerted through D was slight enough so that the shaft would spring back as soon as the prying stopped.

Next a piece of tool steel was hunted up and one end was ground on the emery-wheel to fit the shaft. The corners of the tool were ground off so there would be no danger of marking the shaft should the tool chance to touch the journal bearing. With a sharp pry taken right under the bent spot in the shaft (at A), several smart blows were struck with the hammer upon the top end of tool E, with the result that shaft A being under strain was sprung slightly at A. In this instance it proved exactly enough to bring the shaft straight. We chanced to hit it precisely right, the first time, but might not be so lucky next time, and I have in other cases had to try half a dozen times before getting the shaft bent just right. The principal thing is not to bend the shaft too much. Better bend it a little at two or three times than to bend it too much, and have to bend it back again.

It came to pass that the shaft was bent just enough the first time, and in exactly the right place, so nothing further had to be done in that direction. While the surface of the drum can be made to run true by bending the shaft, it is sometimes at the expense of throwing the journals out of true, and in such cases lose no time in trying to make the journals run true by bending, but put the shaft in a lathe and take a light cut over the journals, thus bringing them into true with the surface of the sandroll. This applies to where the above bending operations are carried out in a lathe instead of in the sander itself, but the same

untruth of journals is sometimes found when the shafts are bent back into place in their own bearings.

Finding Misuse of Felt

But the great cause of the paper cutting in this sander was in the condition of the jacket blocks KH. While block K was in proper shape, and felt blanket or jacket G was properly nailed thereto, the block H was far from being right. As shown at I, Fig. 2, the end of the felt jacket was tacked into a rebate cut in

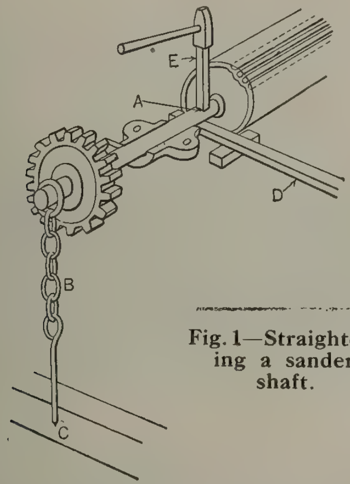


Fig. 1—Straightening a sander shaft.

the face of block H, the thickness of the rebate being about that of the felt. In this case it was found slightly deeper so the wood projected beyond the surface of the felt.

The above condition caused a ridge in the sandpaper the entire length of the roll, and by the time the roll surface was worn down smooth, the paper was cut through along the edge of block H. Investigation revealed that block I was not properly fastened; dust had worked under it so it projected above the surface of the iron portion of the sandroll. Then, instead of taking out block H, and cleaning out the dust, the

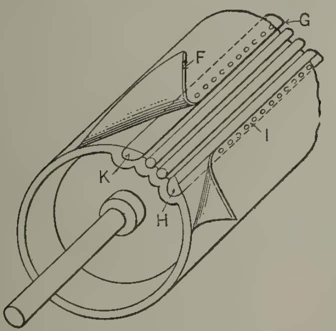


Fig. 2—Arrangement of felt.

operator of the sander simply planed in a rebate, cut off the felt jacket at I, and went right into manufacturing trouble for himself and his employer, in the most (dis) approved manner possible.

A new felt jacket was necessary in this case, and none being available, a piece of thick soft carpet found in the bottom of some buggies and hacks was obtained from a neighboring store and used in place of the felt which had been cut too short by the smart aleck who evidently had dust in his nut as well as under the sander-roll blocks.

The marks were made by the ridge formed by edge of block H which raised the sandpaper so that it touched the work harder at that point than anywhere else. The distance apart of the ridges or marks was the amount of feed per revolution of the sander. The reason the marks disappeared after a new piece of sandpaper had been run a short time was due to the fact that as soon as the paper wore out along the narrow surface of block H, the marks disappeared, and—by the same token—the wornout sandpaper was due to break, which it did—immediately afterwards. There was no more trouble with that sander after we made the above repairs.—Wood Craft.

Origin of the Barrel

Information regarding the origin of many of the most common and continually useful things is meagre, if any is possessed at all. Barrels have, as we all know, existed from time immemorial. They have been known and used for ages, but by whom and at what time the first barrel was made none can say definitely, nor has any record been made thereof. When the early settlers came over to this country they brought the barrel with them, and there is still in existence barrels made by hand in colonial times which it would puzzle a present-day maker with modern machinery to surpass.

Barrel making, or cooperage, is one of the oldest of industrials and goes back farther than Roman history. Indeed, it is quite likely that ages before Rome was a world power they were making barrels and they have continued to make them ever since. Pliny mentions cooperage as among the exact arts in his time, and it must have flourished long before, else it could not have reached perfection.

The question of "who" will probably always remain unanswered, though there are good reasons for believing that people who formerly dwelt among the Alps were the first barrel makers. They might have had teachers from an earlier time, but there is evidence that they were the ones who brought the barrel to perfection. Not only the barrel, but other forms of cooperage as well. Late years many have seen the production of machinery for barrel-making, but even so they can no more than make a barrel that holds liquids, and they did that so long ago that the birth of the tight barrel is lost is obscurity. Therefore since the wooden barrel has made its way and held its own during all the time which has passed, it is a safe assumption that this package, which requires a minimum of material for a maximum of space, which is the strongest package made of so little material, need not fear competition now or in future times.

Publications Received

Cabinet Making, by J. H. Rudd, with chapters by C. A. Zuppann and Walter K. Schmidt, published by the Grand Rapids Furniture Record Company, Grand Rapids, Mich. A practical treatise designed to fulfil the requirements of the cabinet-maker and the manufacturer of household furniture. It will be found especially valuable as a concise text-book for the use of teachers in technical and trade schools. The object of the volume is to describe and illustrate pieces of furniture in which difficulties of construction occur and which involve the introduction of mechanical devices not met with in every-day practice. The book deals fully with the whole process of manufacture, embracing factory planning, estimating and costing, the measuring of rooms, draughting, setting out, the seasoning of timber, veneering and the construction of various types of panelling.

The Woodworking Departments of a Toronto Piano Factory

Manufacturing methods at the Gourlay plant, with particular reference to improved processes and equipment

AN excellent example of a woodworking establishment is afforded by the piano factory, not only on account of the high-grade work which has to be maintained from start to finish in the manufacture of a piano, but also because of the numerous processes which the raw lumber has to go through before the piano is ready to be put on the market. Following we give a description of the Gourlay piano factory at Toronto—one of the most interesting Canadian industries of the kind from the woodworking standpoint.

The Gourlay factory, which was built in 1910, is five-storeys high, of mill construction throughout, and has a floor space of 75,000 feet. Mr. John E. Hoare, superintending partner of the firm, designed the building, and personally superintended its erection. Having had thirty years' practical experience in piano manufacturing, Mr. Hoare was fully qualified for this task, and a visit to the plant at Logan avenue shows what excellent results have been obtained. Special pains have been taken for the comfort of the employees and a particularly noticeable feature is the splendid light on all floors. The staircases are all on one side of the building, this being a great convenience and space-saver. The factory is equipped with a telephone system on every floor, and the sprinkler system is installed throughout. Heat is obtained by the steam-heated vacuum system. Adequate fire protection is evident throughout. About 2,000 pianos are manufactured annually.

Dry kilns at the Gourlay Factory.

The original source of power for the entire plant is produced from two large Goldie boilers of 300 h.p. capacity and a powerful Goldie engine of the latest type. On the different floors are located every sort of device known to the mechanical world, that can be advantageously utilized in the manufacture of Gourlay pianos. There are band saws, circular saws, planers, an assortment of turning lathes, moulding machines, sanding machines, hydraulic presses, an hydraulic lift and other devices. The following well known firms have supplied the above machinery:—Berlin Machine Works, Limited, Hamilton, Ont.; Canada Machinery Corporation, Limited, Galt, Ont.; Jackson, Cochrane & Company, Berlin, Ont.; Wm. R. Perrin & Company, Limited, Toronto; Wysong and Miles.

Preparing the Lumber

The first step in the building of a piano is the seasoning and preparation of the lumber, so that it will properly perform its function in the various positions for which it is destined. This preparatory treatment of the lumber is a most important detail, concerning both the tone and the durability of the piano, for unless the lumber is in just the right condition, the whole instrument might suffer.

Many woods enter into the construction of pianos, those principally used being mahogany, walnut, oak, maple, pine, spruce and whitewood. Each kind is selected with the utmost care, and only that which is absolutely free from imperfections is accepted. About 500,000 feet is consumed annually. A large stock of lumber is carried in the yards, this being deemed necessary in order that it all may remain for from two to three years for out-door seasoning. A unique feature of the lumber yard is the system of handling and piling the lumber. A system of tracks cover the entire yard. The lumber when received, is piled upon flat cars or trucks at the railroad siding, and wheeled upon the tracks to remain for the period of seasoning, about two years. When this period has passed, it is ready to be moved without further handling, along the tracks to the dry-kilns, and later from there to the mill room. In the piling of the lumber, every board is spaced apart both at the sides as well as above and below, allowing a free circulation of air, and ensuring thorough seasoning of each individual board in the yards and during its stay in the dry-kilns.

In the case room.—Sanding machines for small parts.

The system of kiln-drying is a patented process in which by a combination of steaming, direct radiation, and elimination the sap cells of the lumber are ex-

ploded, and the acids and organic matter extracted, leaving only the solid wood fibre, and resulting in lumber which is much less liable to shrinking or swelling than that which is treated in the ordinary dry-air kiln. By this process the danger of casehardening is entirely eliminated, for in the drying the shrinkage is uniform from centre to surface. In drying by ordinary methods the lumber very often drys and hardens on the outside before the centre has a chance to be affected.

The filling room.

Four years' test of this better method in the old factory amply proved its value, and in the new factory no expense has been spared in the construction of kilns of large capacity and exceptional efficiency. The kilns are three in number and have a total capacity of 75,000 feet.

From the dry-kilns to the mill room is the next step. Here the preparation is continued, the boards being kept in stock for a time until they become accustomed to the atmosphere of the factory. The rough boards are first cut up into pieces of proper dimensions and carefully sorted. Every piece is subjected to critical examination by an expert whose eyes have been trained to note the slightest imperfection, and when an imperfect piece is detected, it is immediately thrown aside. Next, the pieces are edged up and the wide ones split. A wide board is more apt to warp than a

Drying room.

narrow one, therefore as a preventive measure it is sawed into narrow strips, which are firmly glued together and afterwards cut into the right sizes for use. They are then given a smooth surface by planing and sanding, after which they are ready to receive the veneer. Some beautiful and expensive veneers are kept in stock, principally mahogany and Circassian and other walnut. The work of attaching the veneers requires much skill in order to secure the best effects, it being necessary that the board and its veneers are in close contact at every point, and that the figure of the veneer be successfully matched. In these pianos all parts of cases, except carvings or mouldings, are veneered twice on each side. The first veneer is laid on with the grain running vertically, across the horizontal grain of the board. The outer veneers are then laid on with the grain running the same way as the board. This cross-banding is another preventive measure against the warping of any part.

In the process of veneering much of the work that was formerly done by hand is done by new and improved machinery. The glue is mixed in an automatic converter which prevents overheating, evaporation or deterioration, it then is spread on the veneers by an improved spreader. The converter and spreader are made by the Advance Machinery Company, Toledo. When the veneer has been applied to the board the whole goes into a big hydraulic press of 100 tons capacity where it remains for 24 hours under this enormous pressure. When it comes out the veneer is so firmly attached that it has practically become a part of the board itself. It is then allowed to dry and harden before being sanded to procure the absolute smoothness necessary to a perfect finish. In order to make quite sure that, in the gluing process, the moisture in

One end of the varnish drying room.

the glue has not in any way affected the wood, the veneered pieces are put away in a special drying room for three weeks.

After the various parts of the piano case have passed through the different stages they are all assembled in the case room where a force of cabinet-makers receives them and proceeds to put them together. It is at this point that the nicety of the work done in other departments of the factory becomes evident. Each part has been so accurately made that with but very slight alteration it fits perfectly with every other part.

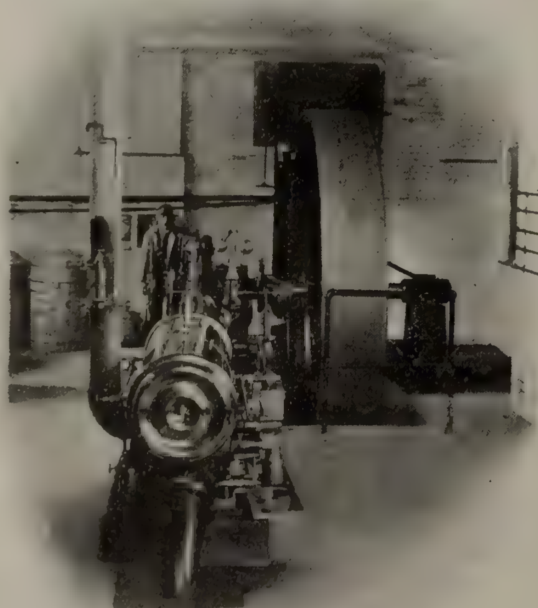
Having been properly fitted and joined, the case is taken apart in order that the finishers may have a better chance to do their work, the finishing department being the next step in its progress. The work of finishing is the climax of case-making and must be performed in a thorough manner.

The first objective point for the case when it moves toward the finishing department is the filling room, the place where the grain of the wood receives treatment with what is technically known as the "filler." This "filler" is a clayey substance applied by means of brushes. Without it the grain is likely to raise up and make rough spots on the surface; but by a judicious use of the "filler" its smoothness is permanently pre-

R

Manufacturing and
Modern Piano Factor
panying Views of the
of Messrs. Gourlay, V

Varnishing by the immersion system. Above, lowering six piano cases into the varnish; below, raising them out of the varnish.



Engine room.

Gluing up case and back-structure.

d.

**ng Processes of the
plified by the Accom-
working Departments
& Leeming, Toronto**

The mill-room.

Matching veneers.

Fine rubbing and hand-polishing.

Rubbing by machine.

Veneering.—Showing a glue spreader and hydraulic press.

The sounding-board room.

Back-making.

served. After the case has been properly filled it is ready for varnishing. The system employed is known as the hydraulic immersion system, and was installed by the International Varnish Company, Toronto. The apparatus consists of:

First—a large steel tank for the varnish, with a capacity of 288 cubic feet. This tank has an adjustable cover which is kept locked when the apparatus is not in operation.

Second—a hydraulic lift for raising the work slowly out of the varnish.

Third—a pump operated by steam pressure.

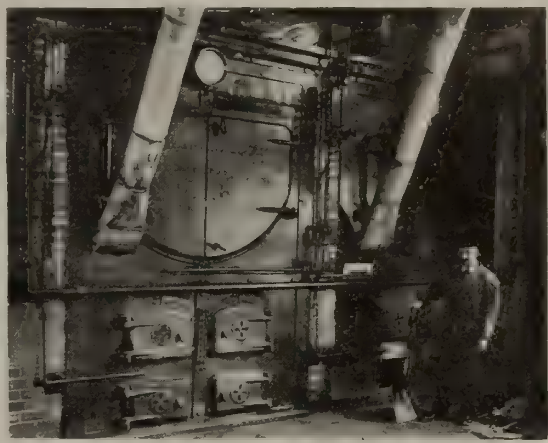
Fourth—a duplicate tank, underground, outside the main building, connected with the first tank by piping. A fusible link makes it possible to draw off the varnish into this outside tank at will and for protection in case of fire. The varnish may be emptied from one tank to the other in less than four minutes.

Fifth—A large number of steel carriers. These carriers each hold six complete piano cases and the cases remain in the carrier until the full coating of varnish is given and the varnish perfectly dry and hard. It is an interesting fact that every piano receives six or more coats of varnish, the number varying according to the wood used. The cases remain in the varnish room for several months, a sufficient interval being allowed between each coat for drying. The method of operating this immersion system of varnishing is simple. Carriers filled with all the various parts of six pianos are wheeled into the fireproof room where the tank is located, raised from the floor, swung directly over the tank and lowered into the varnish by means of the hydraulic lift. Figuring upon the density of the varnish, the operator calculates the speed with which the carrier is raised out of the tank, having a lever conveniently located for control. The time occupied in raising a loaded carrier varies from 30 to 50 minutes. The carrier is then wheeled into the drying room to remain till its contents are thoroughly dry and ready for the next coat.

Case room at the Gourlay factory.

The chief advantage of this system is that it insures an absolutely even coat of varnish and one free from imperfections, which, under the old system of varnishing by hand, are often caused by faulty workmanship, carelessness in handling or deterioration of the varnish.

Pianos varnished by the immersion system are varnished as well on the inside of the case as the outside, thereby minimizing the danger of shrinking and warping—another distinct advantage. After the case has received the full number of varnish coats and is perfectly dry and hard it goes to the rubbing room. It is the rubbing that gives the fine surface, and this work is done both by machine and hand, the parts being rubbed until they are as smooth as a piece of glass. Again, in the rubbing, the value of the system of varnishing is noticeable. There are no brush marks, and almost an entire absence of imperfections, so that much less rubbing is required than by the old method where usually a great deal of the varnish has to be rubbed off in order to obtain smoothness. This better body of varnish on the piano produces a better finish. After the case has been rubbed it goes to the flowing room where a coat of an exceptionally fine grade of varnish is added.



Boiler room, Gourlay factory.

Thus after months of progress, through department after department and room after room, the case comes forth ready to enclose the back-structure and other parts of the complete piano that have been in process of work in other departments of the factory.

The Back-Structure

While the evolution of the case from the rough lumber to the finished article has been in progress, work on other portions of the piano has been proceeding in various parts of the factory, the most important of which is the building of the back-structure.

This back-structure is decidedly an essential feature. It is, indeed, the foundation of the whole piano, and upon it depends to a great extent the durability and musical value of the instrument. In its construction the chief desideratum is strength, for it must withstand the enormous tension of the strings, and at the same time furnish a base of operations for all the parts.

The back is of unusual strength, and is made of clear resonant pine. It consists of six massive columns, carried right to the top of the piano and blocked, and built into the rear of the pin-block or wrest plank. Each column is made of double sections of pine, jointed and double veneered with whitewood and maple. The wrest plank is of many thicknesses of hardest rock-maple, upon a solid rock-maple block, each thickness having its grain run in a different direction to obviate all possibility of cracking.

In the mill room, veneer room and in its department adjacent to the case room, the material for the back is sawn, glued, veneered and fashioned at the same time that the various parts of the case are being similarly treated. Special equipment is used in making the back and a system of models, forms, and exact measurements insure absolute uniformity. When the

case and back have been taken apart again their paths diverge, the case being taken to the finishing room, while the back proceeds to the sounding-board room.

The sounding-board is made of the finest spruce, being built up from narrow strips like the top of a violin. To secure the best results the wood must be perfect and the grain must run just the right way.

The first step in the handling is to subject the sounding-board to an extraordinary degree of heat for a long period, to make sure that there is no danger of its splitting or cracking after it is built into the piano. The next step is the gluing on of the ribs and of the sounding-board bridges, which is done in large gluing frames, the undersides of the frames, upon which the board lies, being alternately convex and concave in shape to accommodate the convex shape of the sounding-board.

In the gluing of the sounding-board into the back, special equipment is found, steel presses taking the place of the ordinary wooden handscrew.

The keys of the piano are mounted upon the best grade of white pine. After the interior of the piano has been put into the case and various tunings have taken place, the case is ready to be fine rubbed and polished. The mirror-like lustre is obtained by the deft rubbing of the palm of the hand along the smooth varnished surface. This requires considerable skill, not every hand being suited for the work. Just previous to the final inspection of the finished piano, the piano is cleaned and oiled and is ready for the market.

In the foregoing description we have given a general description of a factory which, while embodying much of standard practice, contains, nevertheless, many points of interest to the woodworking industry.

Methods for Use in Glue Spreading

CONSIDER glue as a liquid adhesive that naturally sticks to almost any surface with which it comes in contact, and in that light it looks as though the art of glue spreading is nothing but a simple process that any boy can understand, writes C. R. Mason, in Wood Craft.

And the mere mechanical act of spreading glue is a simple thing, too, but just the same it is right here that a lot of attention is concentrated, especially in the work of veneering. Occasionally we see a man who is disgruntled, feels that he has perhaps bought the wrong kind of a glue spreader and ought to have got some other make.

But it is not that so much as it is that he has failed to fit either the spreader or the glue to the work he is doing. In fact there is less difference of fundamentals than there is between planers or any other line of woodworking machines. There are a number of machines that are different, machines made for special work, such as gluing tenons or spreading glue on the edges of strips, but the regulation glue spreader for veneer work consists merely of a pair of rolls, with reservoirs for holding the glue, with a driving mechanism for the rolls, and a heating provision for the reservoirs. And today practically all those rolls are of metal.

The main difference between machines is in the face of the rolls, and this difference is one of fitting them to the work they have to do. In other words, when you get a glue spreader that does not spread just as you think it should, it may be more a lack of understanding on the part of the machinery man of your exact requirements than it is a matter of difference between this make of machine and some other. It may merely be a matter of speed, roll faces, or something of that kind.

The matter of speed is pretty well understood now, but if not understood, a little experimenting will show what is the best speed at which to operate a glue spreader. The most important consideration, as far as the mechanical work of spreading glue is concerned, is the faces of the rolls. These are matters of temperature, thickness and quality of the glue itself, but this should be considered apart from the purely mechanical work of spreading.

When machines first came into use for spreading glue the rolls were generally covered with Brussels carpet, which it was figured would act as a sort of sponge to take up and carry the glue. Some varied the thing by winding the rolls with a soft rope. It was found in the case of the carpet covering that it made a mean thing to clean. In the course of time it wore off, filled up with dry stale glue, and thus became irregular in its spreading.

The machinery men got to experimenting with the metal rolls without any covering, and with devices to feed regularly a certain amount of glue, and out of this has developed a more or less confusing system of making rolls with faces to suit different kinds of work. Some have coarse corrugations, some finer ones, some have thread-like corrugations cut around the roll instead of lengthwise of it, and some are smooth-turned.

It is right here that the average man gets mixed up in this apparently simple mechanical process of spreading glue. He perhaps figures out for himself that a certain make and type of machine is what he wants. So he gets that, and if he has guessed right he is happy, and maybe gives the machinery man a testimonial. If he guesses wrong he is in trouble, and then he gives the machinery man particular fits. It is just a matter of roll faces, for the machine itself is a simple contrivance.

Perhaps the hardest equipment to make and to have just right all the time is one that must do a wide range of work, using both hard and soft wood, for the very thing that is best for one is not best for the other. The softer woods generally need more glue, and thicker glue, than the close-grained hardwoods. This matter will partly take care of itself.

Say that you are using a smooth-faced metal roll; when the glue is made thin for hardwood the roll will naturally carry less of it than when it is made heavy and thicker for the softwoods. But this natural tendency to take care of itself, while it helps some, does not serve all the needs by any means, and the only sure way to get just what you want is for the machinery man to look over your work, draw on his past experience, and fit up the rolls accordingly.

That all looks simple, too, and it would be easy, maybe, were it not for the fact that the glue item is a big one in the cost account of veneering. This makes a desire to economize in it, and a figuring to see how little can be made to do the work. We take for an axiom that it is foolish to waste glue, and we help to strengthen this conviction by the argument that

too much glue does not make a good joint. This is the devil, and the deep sea is right on the other side in that if not enough glue is used it is worse than if too much were put on.

Therefore, in the end, this simple mechanical process of spreading glue gets to be complicated, but the complications do not come from fundamental difference between the various makes of machines, nor from the act of spreading glue on the surface of wood being difficult and complicated within itself; the complications come mainly from the hair-splitting practices resorted to mainly because glue is an expensive item where it is used extensively. It may often be a good idea to forget this fact for awhile in planning and equipping a glue-room, and concentrate the attention on getting the equipment in such shape that it will spread evenly and surely the amount of glue needed on the work.

Misjudged Economy

The tendency of some people to begrudge every expense for shop equipment seems rather queer. It is a fact however, and particularly noticeable where it happens in a wood working establishment.

In this kind of work, the accessories, such as heads and cutters are fully as important as the machine itself. Still some firms will not spend a penny more than they have to, thinking any cheap thing will do, and then expect an operator to get full efficiency from a machine.

In such a case a big part of the money paid for a high-grade machine is practically wasted. A good machine, which would prove an excellent tool if equipped in the best way, might prove less efficient than the older machine. The result is a greatly reduced output of the machine, and sometimes the operator is blamed when really the cause of the trouble is to be found in the inexperience, and perhaps, stinginess, of the very persons who would be most benefited by the additional outlay necessary for proper cutters.

Waxing a Broken Gear

The small gears around woodworking machines frequently become so badly worn that they must be replaced by new castings. The average woodworker does not always have facilities for making patterns, even if he has the time to devote to such work, says Wood Craft.

When a gear is merely broken and is in otherwise good condition, it may be taken to the foundry, placed in the sand and a pretty good gear casting made from it. But with a gear that is badly worn conditions are different and some other course must be taken.

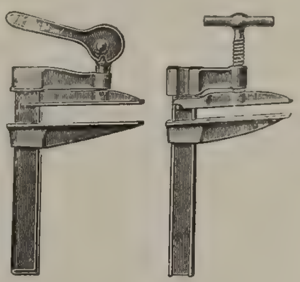
Take, for instance, a small pinion 3 inches in diameter, teeth about ½ inch in thickness, and worn half way on one side only. There is not a molder in existence who can make a good casting from such a gear, but there is a way by which the woodworker may obtain a first-class casting from such a wornout pinion.

The method is to procure some beeswax and warm the gear to about 80 or 90 degrees Fahr. Then with a candle or a small lamp melt some of the wax, and with a putty knife or some other suitable tool, press the softened wax into the worn parts of the gear teeth. After a little effort in this direction, the gear teeth may be easily and quickly built up to their original shape and condition. If the shape is not quite correct, then melt on a little more wax or trim off a little with a sharp knife as conditions may require. It is a pretty easy job to build up a small gear in this way.

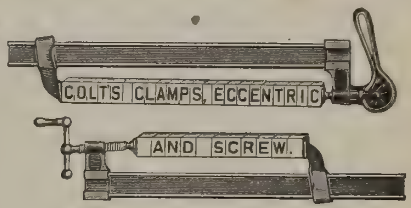
Mention has been made of the manner in which one woodworker patched up a worm. It is possible to build up wormwheels in the same way, and many an expensive pattern may be avoided by patient and judicious use of beeswax and a sharp knife.

Colt's Clamps

The woodworker is always on the watch for improvements in his outfit, and the illustrations herewith of several styles of Colt's clamps, manufactured by the Batavia Clamp Company, 157 Center street, Batavia, N.Y., show some quick-acting clamps that are



Universal Clamp



Cabinet Clamp

worth investigation. The sliding foot grips the bar at any point without the aid of dogs or springs, and one movement of the cam sets the clamp firmly against the work. The rapidity with which they can be adjusted is a feature of their clamps. The steel bars are made special I-shaped, the flanges giving additional strength, prevent twisting, are comparatively light and the

Short Reach Clamp

clamps easy to handle. Another style is made of U-shaped steel, bent cold, which hardens and stiffens it. The fittings are made of best quality refined malleable iron. Special attention is called to the Short Reach clamp for wide thin work, like dresser and table tops. Their catalog No. 187 giving full information may be had for the asking.

Wood Worker Philosophy

One can make a turning lathe with a few irons, some wood and a little time, but can buy a better one for less cost.

Some new patterns in mortisers make their appearance in the machinery world now and then. Have you been keeping up with them?

Why should a man convert a sticker into a shaper when the shaper itself is one of the least expensive machines and will do the work much better.

You can do good flooring work on a light matcher, but nothing like the quantity of it you can do on the big new machines.

There is lots of waste stock around the average planing mill or factory that might be worked into rods or dowels.

Carpentry and House-Building

A permanent department devoted to practical problems of construction and planning. Readers of the Canadian Woodworker are invited to contribute to this department and to submit details of work involving special difficulties.

The Evolution of Handrailing

A comparison of Various Systems of Laying Out the Work as Made by an English Writer

THE subject of stairbuilding is one of never-ending interest, more especially the many problems which arise in connection with the art and science of handrailing, and in the comments which follow on the evolution of this phase of the work many of our readers will doubtless find much to hold their attention. The extracts are taken from a paper read by George Ellis before the Incorporated British Institute of Certified Carpenters at a meeting of that body in London and in addition to the various diagrams presented in connection herewith models were used to illustrate the paper.

The earliest stairs constructed seem to have been spiral ones, winding around and between circular walls, usually chambers constructed apart from the building to contain them; few of these appear to have had handrails, ropes being the common aid to ascent. In the twelfth century, rectangular stairs were introduced, and the first of these were protected with iron balusters and handrails. An example still exists in the Cathedral of Sens, Province of Yonne, France.

The earliest attempts at forming a wooden handrail rising over a curved plan do not seem to have been recorded; or, at any rate, I have been unable to find any reference to such work earlier than the middle of the eighteenth century, and, as this relates to a veneer process, it may be reasonably inferred that when the art of joinery had reached this stage, a cruder method in this difficult branch would have preceded the veneer method; and deducing, from the generally accepted theory in analogous cases, that all early work in joinery was based upon, or adapted from, the stonemasons' methods, we may assume that the first handrails were built up in solid pieces in situ on a balustrade of solid screen to the stairs to which the handrail formed a kind of coping, which was afterward worked to the desired shape. Such a rail and balustrade still exists, I believe, in the Chateau of Louis XII. at Blois, Loir-et-Cher, France, which is reputed to have been built in the fifteenth century.

When, however, the open balustrade was designed, constructed of a series of separate parts, this method would become too cumbrous, and it may well be surmised that the next step would be the building up of a "centre" or "cylinder" of the shape of the rail in plan to the surface of which the rail might be fitted. Whether the tentative fitting of solid pieces to this cylinder preceded the veneer process or followed it, I have been unable to determine; but of existing examples, the "veneer" rails appear the older.

The veneer process is first described by William and James Pain in the "British Palladio," 1793. Six lines are devoted to the process! which I will slightly amplify. A cylinder, similar to the one I have here, was made to the shape of the outside of the rail in plan, with sides perpendicular to the base—as you will observe, similar to the "drums" we use now-a-days for bending wreathed strings upon.

After setting out the steps upon the surface of the cylinder, a piece of wood, usually oak of straight grain, was selected and sawn into veneers, which were then, presumably, soaked in hot water—the authors are silent as to this—and bent around the cylinder on the nosings of the stairs, to which they were clamped after gluing together in their original order. When thus made up to the necessary width the wreath would be, as we now describe it, "bevelled" and "squared" ready for moulding. Given true helical curves, such as I show on this small model cylinder, this process would be easy and effective, but when awkward plans had to be dealt with, and the rail had to be eased out of a true falling line, the method offered difficulties that caused it to be abandoned, and we find that late in the eighteenth century wreaths cut out of the solid were again used, and these bear evidences of being fitted to a cylinder, that is, the sides have more perfect curves than the top and bottom edges.

About 1792 Peter Nicholson, a young cabinet maker, who had studied geometry to some purpose, read a paper at a meeting of the Society of Arts explaining a method he had devised for obtaining the shape of moulds for handrails by a geometrical process. That is, he discovered that a templet cut to the shape of the given section of a cylinder could be applied to the upper and lower surfaces of a plank, and the wreath piece cut out to the lines so marked would have accurate vertical surfaces without the necessity of fitting them to a cylinder. For this discovery he was awarded the society's gold medal, and the principles he adopted for forming face-moulds are still in use, though his methods have been much simplified.

In 1832 Nicholson published his "Carpenters' and Cabinet Makers' Assistant," in which he fully described the above process; which depended upon locating three arbitrary points in the air, or upon the surface of an imaginary cylinder. He was at this stage within an ace of discovering the principle of the later tangent system; but I suppose old habits tied him to the cylinder, and he was content to develop its surface into a plane and thereon to draw falling moulds fitting the profile of the stairs, and then, by a rather involved geometrical process, determine the required section of the cylinder by means of ordinates, and so obtain the facemould. Handrailers working by Nicholson's system produced the joints by means of the two moulds.

The falling moulds, of which there were usually two—one for the inside and one for the outside of the rail—giving the side or edge cut; and the facemould, the top or face cut, the edge of the plank requiring to be bevelled before the application of the moulds. The joints used were perpendicular to the plan and were then called splice joints, the part being connected by ordinary "wood" screws. These joints, now only used in steep pitches over narrow wells, are now known as "bevel cut joints."

I have omitted to mention that previous to Nicholson's first book, the "British Carpenter," by Francis Price, appeared in 1733, giving very vague, but grandiloquent, instructions for making wreathed handrails by a building-up process, that is, by gluing pieces on the sides of the straight rail, until it was sufficiently wide to cover the plan, then "easing it off to a graceful curve," as the author expresses it, by aid of moulds, which, however, he forgets to inform his readers how to obtain.

Peter Nicholson's work having shown that it was possible to demonstrate in a drawing exactly the shape of any desired rail, and thus placed the art, for the first time, upon a scientific basis, caused a great interest to be taken in this branch of joinery, and many writers followed him, some improving, some confusing, his methods.

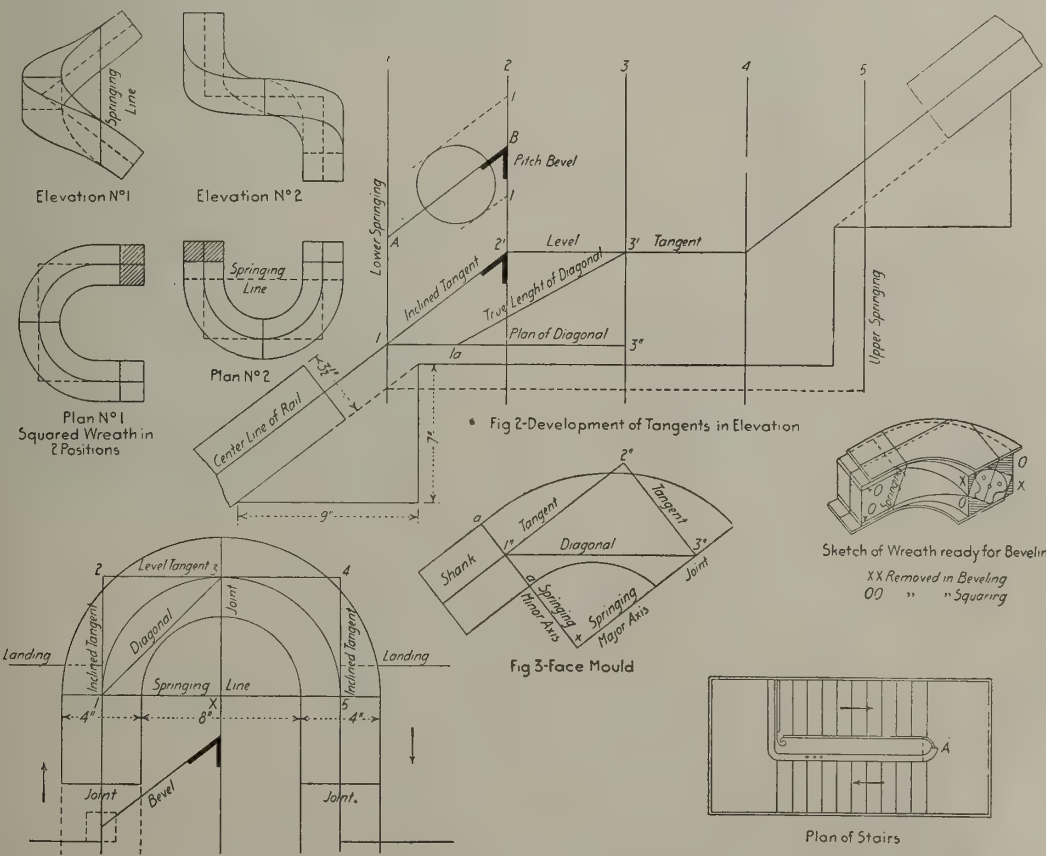
Among the former may be mentioned Joseph Banks; W. J. Easterbrook, who first described what is now known as the "square-cut" system, dispensing with falling moulds; David Mayer, who simplified Nicholson's bevelled ordinate method by using squared ordinates, drawn parallel to the horizontal trace of the oblique plane, or pitch of the plank.

Two American writers next came to the front, Charles Hill and Robert Riddell. Both of these used the ordinate system, the latter somewhat improving Mayer's method, but he chiefly attained his reputation by an energetic canvass of the country personally visiting workshops, and working a rail to an admiring audience, whom he afterward invited to subscribe to his book.

In 1870 the next great step in advance was made by G. Walton, who published his "New Guide to Handrailing" at Manchester, describing a method of producing facemoulds by means of tangents to the curves without the aid of ordinates. His book proved a comparative failure, partly through the imperfections of printing and engraving, which made his explanations difficult to follow, but it gave the clue to the present simplified system, which I purpose explaining with some detail presently.

Since the aforementioned a host of writers have dealt with the subject, including your humble servant. I cannot claim to have added much that is new, but trust that I have somewhat simplified the methods already in use. There has been one other system recently introduced, under the title of the "Normal System," which, however, does not seem to possess any advantage over the square-cut system, save as a geometrical exercise, there being a redundancy of lines necessary to obtain the moulds, the method of using the moulds being a cross between the facemould and falling mould methods.

I now propose to illustrate, by aid of these models, how a facemould is produced by means of the "square-cut and tangent" system, of course taking an easy example, to avoid confusion of detail, merely premising that the principles hold good for any case, as you can

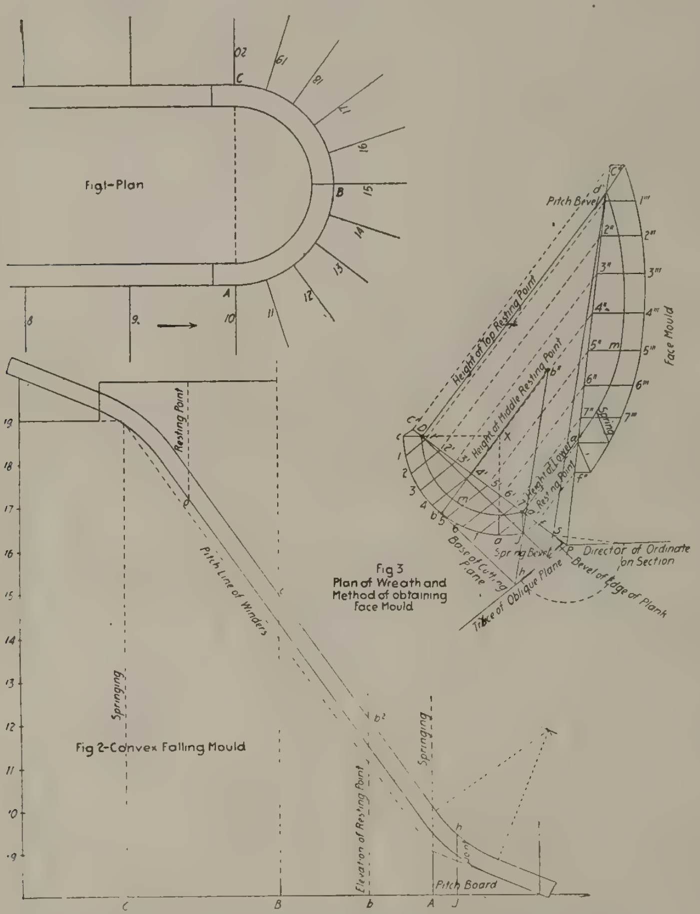


The Evolution of Handrailing—Plate 1—Handrail Diagram of a Half-Space Landing

see by inspecting the drawings shown on the walls. You are, probably, aware that the solid, termed a right cylinder, having straight or vertical sides and circular ends, when cut at any inclination from the horizontal, its section will be an ellipse, varying in shape according to the inclination of the section. Now if that cylinder is made to fit one of the surfaces of the rail in plan, it is obvious that any section of the cylinder will stand vertically over its plan, and all we have to determine is the inclination of the section required.

Now, resuming my main explanation, we require a given section of the cylinder to act as a templet or mould for marking the wreath piece, and as we make our drawings on flat surfaces, it is easier to deal with a plane surface than a curved one when marking lines on it, and this is the key to the tangent system.

Well, now let us draw it on paper. Here is a plan of a wreath over a landing (see plate 1), with lines drawn tangent to the central curve, 1, 2, 3, 4, 5, with



The Evolution of Handrailing—Plate 2—Showing Nicholson's 3-Point System with Beveled Ordinates; Also Wreath for Half Space of Ten Winders.

a joint in the middle at 3, and steps and landing drawn in position. The lines represent the planes I have just shown you, and in this case the wreath will be inclined up to a point 2, over the stairs, and level from 2 to 4 over the landing, and inclined in opposite direction from 4 to 5 over top flight.

Next develop the tangent planes, that is, turn them out flat, like your paper, and draw the steps as they intersect the planes in plan (see Fig. 2). On the nosings draw the rails and their centre lines, produce them to the elevations of points 2 and 4 and join them by the level line.

This gives us the tangents in elevation or "pitch of the plank," and a third line is required to obtain the shape of the section of the enclosing prism. This line, shown from 1 to 3 in plan, is called the "diagonal," and as it represents one edge of the section, it will run from 1 to 3 in elevation also. Draw a level line from point 1′, Fig. 2, and on it, from the point 3″, which is perpendicularly under point 3′, the top end of the line lay off the length in plan, as point, 1a, join 1a3, and the true length of the diagonal is found. Next draw a triangle with the three lines shown on the development; the diagonal, and the two tangents, as 1″, 2″, 3″, Fig. 3 produce the inclined tangent line to required length for joint, and draw the joint square to it.

We have now the shape of the section of the enclosing prism, or tangent box, and as this plane contains also the section of the cylinder, we will draw that shape upon it. The shape of the cylinder section will be an ellipse, and as the easiest way to draw this figure is by trammelling, it is necessary to have the direction of the major and minor axes of the ellipse, so we draw two lines on the section plane, or face-mould, parallel to the tangents at the springing points of the curve, which in this case will be the direction of the axes, the section plane being level in one direction.

At this stage I must point out that the imaginary cylinder we have been using is abandoned, and we now deal with two parallel cylinders, representing not the centre line, but the inside and outside faces of the rail, because, of course, this is what is wanted on the face-mould. So mark off on the springing line, 1″—x, Fig. 3, points a a the width of the rail, as shown in the plan; this gives one point in each elliptic curve, and one other point is required, the width of the mould at the other end. To obtain this, place the length of the tangent 1″ 2″, Fig. 3, upon its developed plane, Fig. 2, as at A B. On this line set off the width of the rail in plan, producing the sides to intersect the perpendicular, 2, in points 1-1, which is the required width. Set this off on the facemould and trammel the curves from the two points completing the mould by drawing the sides of the shank parallel with the tangent line. This mould is used to line out the wreath piece, which is cut to the shape square through the plank. Then the tangent lines on the mould are transferred to both sides of the wreath piece, the centre of the stuff marked on each joint.

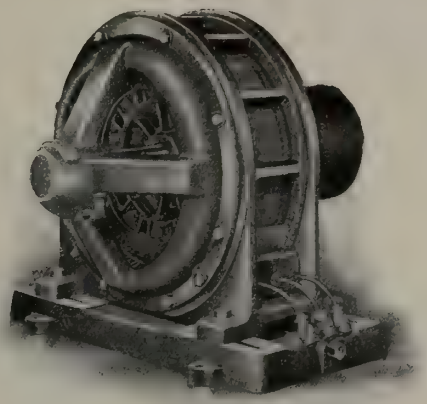
I should have told you that the joints are to be made first, square to the tangent lines and to face of stuff, and the bevel, B, which is really a plumb line, representing the sides of the rail when at its proper inclination, is drawn through the centre point, on the wide, or central, joint. This bevel line indicates on the top and bottom surfaces where the mould has to be placed ("slid" is the workshop expression), for lining out the edges of the wreath, so that when cut to them, the sides will be vertical, or would "fit the cylinder."

I now turn to ordinate systems, and on this drawing (plate 3) are shown, side by side, for the sake of comparison, wreaths for a half space of balanced winders, the moulds produced, one by the tangent system, with trammelled curves, and the other by an improved ordinate system. Ordinate systems may be briefly described as the drawing of level lines; first on the plan of the rail, then upon the inclined plane, representing the face of the plank, which correspond, or lie directly over each other, then making the two sets of ordinates of corresponding lengths measuring, points in the curve, from some common plane to produce a facemould. It is in the selection of this measuring plane that the various ordinate methods differ. In

Electric Driven
Wood Working Machinery

INCREASE
PRODUCTION

REDUCE
MAINTENANCE



PROMOTE
CLEANLINESS

ELIMINATE
FIRE RISK

DIRECT
CONNECTED
MOTORS
ELIMINATE
BELTS
AND
REDUCE
ACCIDENTS

ALL SIZES CARRIED IN STOCK FOR STANDARD VOLTAGES, DIRECT OR ALTERNATING CIRCUITS.

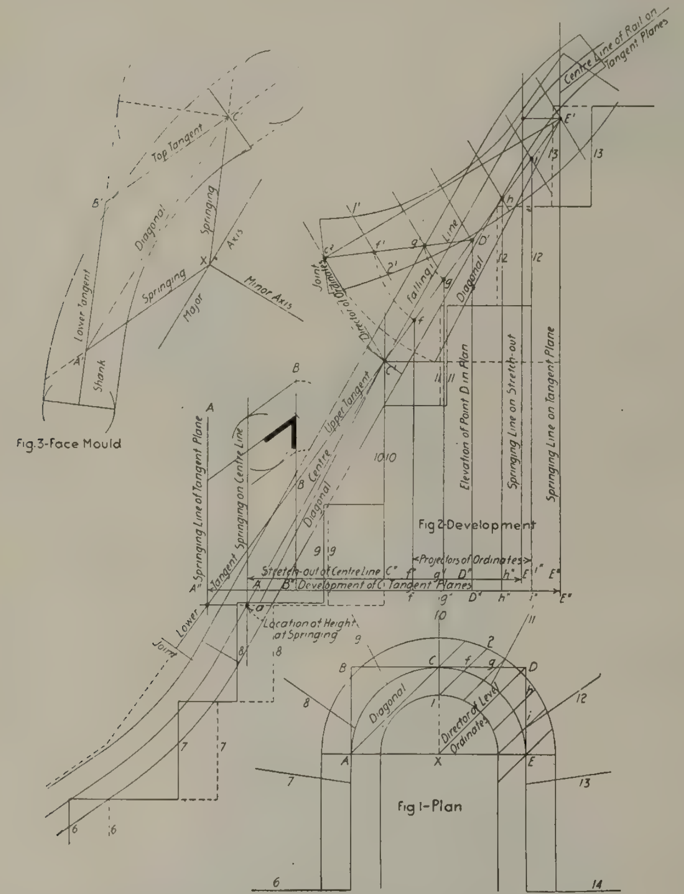
Canadian General Electric Co., Limited

Head Office, TORONTO

MONTREAL HALIFAX OTTAWA WINNIPEG CALGARY VANCOUVER VICTORIA COBALT
REGINA EDMONTON PORCUPINE SASKATOON NELSON PRINCE RUPERT

Nicholson's method, which is shown on this drawing (see plate 2), he uses a plane touching the two salient angles of the rail in plan, as shown by line, D-a′—P, Fig. 3. The plan ordinates, c, 1, 2, 3, 4, 5, 6, 7, a, are drawn parallel to the horizontal trace of a section of an irregular prism which is constructed to enclose the plans of three resting points on the imaginary cylinder. These points are indicated in plan, Fig. 3, by the dots, a′ b′ D, and in elevation by the circles, a″ b″ d″, the heights being obtained from the stretchout of the outside rail in elevation, Fig. 2, and are arranged perpendicularly over their plans. Lines are drawn through these points to the ground plane, and a line joining their intersection with this plane gives the trace of the oblique plane.

The plan ordinates are projected from the plan of the sides of the prism, D-P, to the edge of the section. From the intersection, 1″, 2″, etc., other ordinates are



The Evolution of Handrailing—Plate 3—A Half Space of Winders; Face Moulds by Trammel and Ordinate-Method Compared

drawn parallel to a director, found as follows: Take any point, S, in the line, D-P, and draw a perpendicular therefrom, intersecting the base of the oblique plane in point, n. From point, P, as center, and p n as radius describe an arc, which intersect by a perpendicular to the inclined edge of prism a″—P drawn from S. Join the point of intersection to P. All that remains to be done is to make the correspondingly numbered ordinates of the same length, and trace the curves of the mould through the points so found. By this method, the edge of the plank requires bevelling to the spring bevel, shown in plan, before the pitch bevel can be drawn on the edge for the purpose of sliding the moulds.

I will now show you a much simpler method of obtaining moulds with ordinates (plate 3). Here the center line of the rail is enclosed with tangents, C.D.E, in plan. These planes are unfolded in Fig. 2 and the pitch of the tangents is shown as a straight line from E′ to C′ that being so, point D′ is half the height of E above C, therefore a line drawn from D in plan, Fig. 1 to X, the opposite side of that square prism, must be a level line. Ordinates are drawn through the rail parallel to this line, cutting the sides of the prism C′ f, g, D′, h, i, E′. These points are set off on the development, C″, f″, g″, D″, h″, i″, E″, and perpendiculars projected to the line of section C′ E′. Next the plan of section is unfolded on the edge, D′ E′.

Obtain true length of diagonal, C′ E′, as described previously, with length as radius and E′ as centre, describe an arc. With D′ as centre and D′ C′ as radius describe another arc, intersecting the first in C^2. Join C^2 E′, which places the diagonal in true position on the plane of section. Join C^2 D′, which shows the edge of section in its new position, and join C′ to C^2 and this is the director for the ordinates on the section, which are drawn through the points on the edge of the section, as shown.

Next make the ordinates on the section the same length that the similarly numbered ones are in the plan, measuring from the tangents or face of the prism, as f′ 1′ and f′ 2′ the same lengths as f 1 and f 2 in the plan and so on. Having completed the points, draw the edges of the facemould through them by means of a bent lath, or French curves.

Draw the joints square with the tangents, and mark the sides of the shank parallel with the same, thus completing the mould.

Laying Hardwood Floors by the Carpenter

THE average carpenter requires no special training to lay oak flooring. It is necessary, however, that he should acquire a full knowledge of all the grades, thicknesses and faces in the plain and quartered oak flooring, as well as prices from the local dealer before estimating any jobs.

It brings to the writer's mind how a progressive carpenter having a few days' leisure time, went around and secured jobs for the laying of oak flooring in old homes. It proved so agreeable and profitable that he is now what is termed "a professional floor-layer." The dealer in his town would not supply all the different kinds of oak flooring that he required, so he was obliged to make working arrangements with an oak flooring manufacturer who now supplies his needs. To-day he is securing jobs within a radius of 100 miles of his home town and employs about 10 men the year around.

It seems to be the general impression that in order to make a successful hardwood flooring job one must be a professional floor-layer. This is not true. Any ordinary carpenter with any judgment at all can lay oak floors. After the floor is laid, the process of scraping is necessary to make a good job. On the finer jobs a hand scraper is recommended, but in places where there is a large surface there are many types of power-scraping machines on the market that will do this work cheaper and easier. Sometimes No. 1 sandpaper is used after the scraping process.

The finishing of an oak floor is a matter of taste. It is always best, however, to apply a good liquid floor filler first and then a coat of pure white shellac. This gives a firm basis for the final finish, which is usually wax or the numerous finishes offered by different

HARDWARE Dealers can sell Simonds Hand Saws with full confidence that the manufacturers stand back of the broadest guarantee any carpenter will require.

The carpenter is the man to be satisfied when buying Simonds Saws. These Saws are made of Simonds Steel and fitted with carved and polished applewood handles. Every saw ground to such a true taper that it cuts with very little set.

If you have never tried a Simonds Hand Saw you owe it to yourself to step into your Hardware Dealer's and ask him to show you a Simonds Saw. Write for a free copy of our catalog or write us for further prices.

Simonds Canada Saw Co., Limited

St. Remi St. and Acorn Ave.,

St. John, N. B. **Montreal, Que.** **Vancouver, B. C.**

Or Simonds Mfg. Co., Fitchburg, Mass.

paint concerns. Any of the large paint companies will send complete information on the finishing of oak floors upon request.

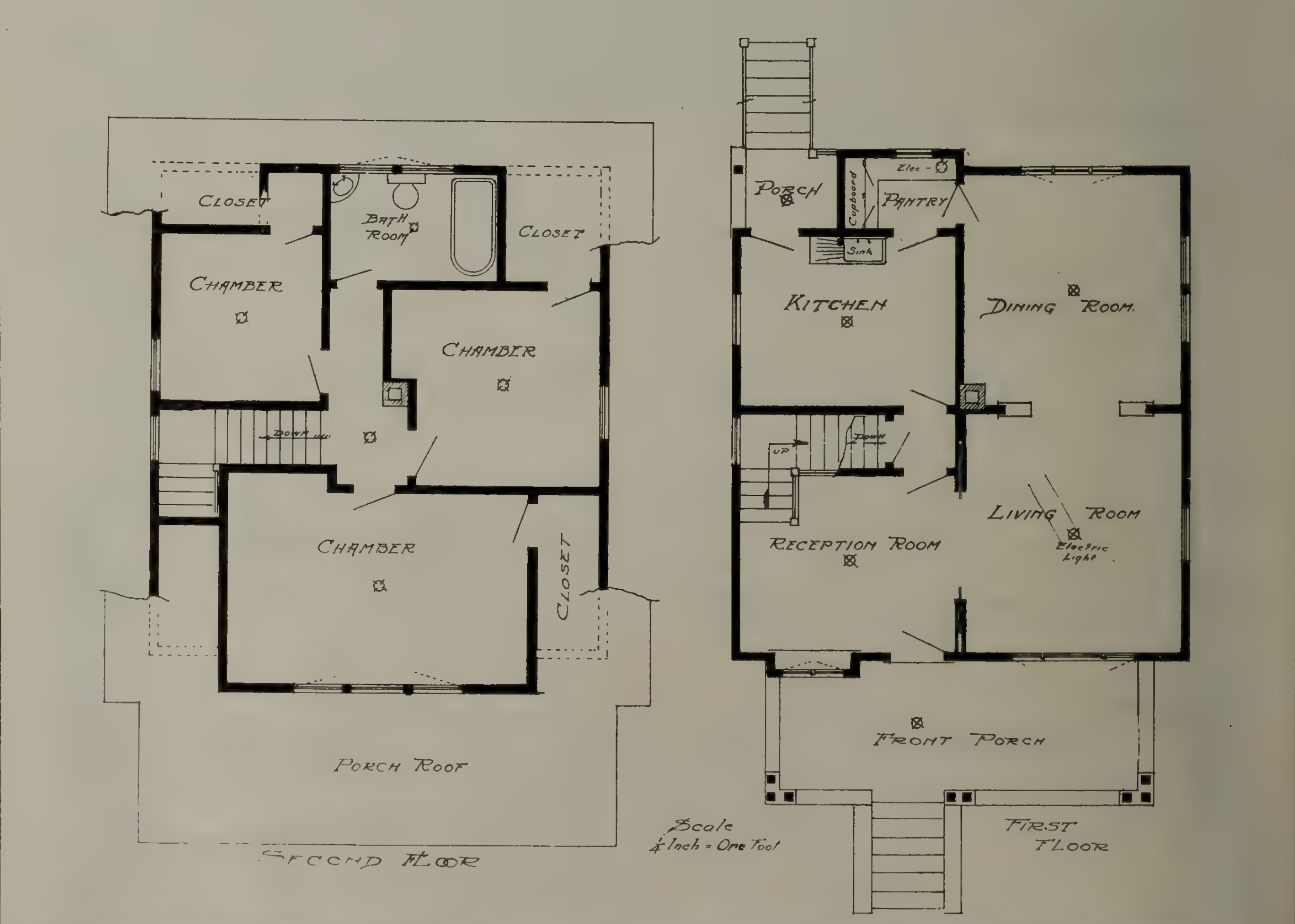
Carpenters can secure from their local dealers or get information that will inform them where a catalog as issued by the oak flooring manufacturers can be secured. This book gives complete and valuable information on all the different kinds of oak flooring, thicknesses and faces, besides it tells how to lay, the kind of nails to use, how to estimate and other pertinent information that the carpenter should have knowledge of before undertaking jobs of this nature.

Small Dwellings of an Attractive Type

THE cottage illustrated herewith is a handy type now being built by the Coquitlam Construction Company, Limited, for The Coquitlam Terminal Company, which latter company owns the largest portion of the property included in the newly incorporated limits of the city of Coquitlam, and is building a type of residences and business blocks suitable for the wage earner, business man, financier and such as the new city may require according to the needs and purposes of the owners.

The lots are 33 x 122 feet on the average, and houses vary in price from $1,500 to $3,600. The difference in price is due partly to the location, size of building, nature of heating apparatus, plumbing, fixtures and mantels. The outside finish of the higher priced houses consists of rough cedar siding or rustic alternated with shingles. The size of the average house is 26 x 28 feet, storey and a half or two-storey, and 26 x 36 for one-storey bungalows. The houses consist of five to eight rooms. The basement walls are of 2 x 4 studdings, sheathed and shingled, and are built of No. 1 fir lumber. The basement floors are of 6-inch flooring on cedar sleepers. The walls in the typical $3,650 dwelling consist of 2 x 4 studs covered with shiplap and rough siding with tarred building paper between. The floors are of No. 1 E. G. fir flooring, sanded for oil finish. The general finish is of flat grained fir.

The divisions of the better priced dwellings and the dimensions of each of the rooms are as follows: Drawing room, 14 x 14 feet; dining room, 13 x 14 feet; reception hall, 10 x 12 feet; bedrooms, 12 x 13 feet; kitchen 10 x 12 feet; bathroom, 7 x 8 feet. The first storey is 9 feet high, inside measurement, and the second storey is 8 feet 6 inches. The floor joists are of 2 x 10 in some cases and 2 x 8 in others, and are set on 16-inch centres. The studding is 2 x 4, and the flooring is of edge grain fir.



Showing the two floors of one of the more expensive dwellings built by the Coquitlam Terminal Company.

Sander Agency

Advertiser desires to arrange with reliable woodworking machine shop to manufacture their sanders and place them on the Canadian market. Give full particulars, which will be treated confidentially.

Box 25, Canadian Woodworker.

PATENTS

LLOYD BLACKMORE & CO., Regd. Patent Solicitors & Attorneys

We have an interesting and valuable booklet "Patent Protection," which will be sent free upon request.

409 Lumsden Building - - TORONTO, CAN.

Booth

Felt Washers, Packings, Gaskets, Etc.

Save Time and Money

All sizes now made in Canada and shipped within 24 hours. Try Booth out on a basis of quality, time and cost.

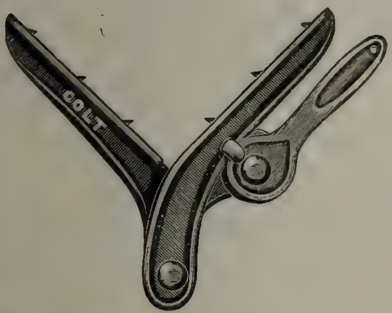
Booth Felt Co., Limited, Gananoque, Ont.
Branch of N. E. Booth, Brooklyn, N. Y.

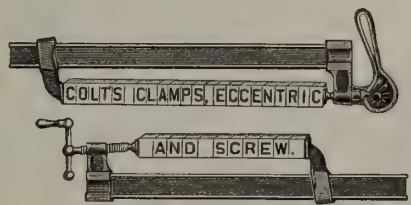
FOR SALE

Automatic cut-off saws, Greenlee Bros. & Co.
Bor. Mach. Sing. Spdle. horiz. "American."
Circular siding resaws, 26 and 36-in. Fay & Egan.
Double cut-off saws, iron, "Buss," "Fay & Egan."
Double cut-off saw, iron, Roller Table, "American,"
Jointers, 12-in., 16-in., 20-in., Clement, American, Smith.
Knife Grinders, Auto. 30-in., 32-in., 54-in., "Egan," "Rogers."
Lathe, back-knife, auto. 8-ft. x 8-in., Pringle & Brodie.
Mortisers, power, H. B. Smith Machine Company.
Mortiser, power, horizontal, Black Bros.
Moulders, 6", 8", 9", 10", Fay, R. & H. Houston, American.
Planer, Pony, 24-in. x 6-in., "Springer."
Planer, Cabinet, sec. rolls, chip-br. 36-in. American.
Planer, Cabinet, 50-in., sec., rolls, "Buss Mach. Works."
Pulley Boring Machine, Millbury Machine Works.
Sander, disc and spindle, J. A. Fisher.
Sander, sing. spdle. oscillating., American.
Sanders, 30-in. and 54-in., "Columbia."
Sander, 42-in., Royal Invincible, "Berlin."
Sander, 24-in., 2-drum Invincible, "Berlin."
Saws, Iron, Trim. Dou. Arbor, Clement; Buss; White.
Shapers, dou. spdle. iron top, Smith, Fay, Superior.
Shaper, dou. spdle. wood table, "Buss."
Surfacer, 26 x 10-in., Heavy roll feed, L. Power & Co.
Surfacer, Double cylinder, 6-roll No. 20 Egan.
Tenoners, sash and door, H. B. Smith Machine Co.
Tenoner, Double End, "Buss Mach. Works."
Window frame machine, Smith & Phillips Mfg. Co.

Lamson Cutter Head Co.

30-32-34 N. Jefferson Street, CHICAGO, ILL.





COLT'S CLAMPS

Eccentric *STEEL BAR* *Screw* *Quick Acting*

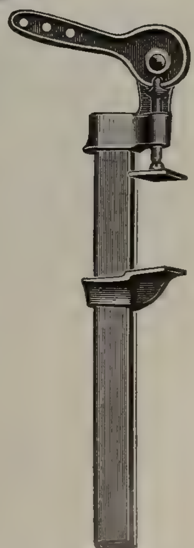
We have many styles, but can show only a few in this limited space. If its CLAMPS, we can supply just what you want either direct or if you prefer write us for the name of a Canadian Dealer.

We have made clamps for 32 years.

Ask for catalog No. 187.

Batavia Clamp Co.

157 Center Street, Batavia, N.Y.



The chief architectural features of these dwellings is to be found in the quality of accommodation provided at a nominal cost. The aim of the contractors is to build attractive homes which will appeal to the various locators, giving due attention to the possibility of arranging rooms so as to receive all available space which the floor area will permit. They insist upon

Front and side elevation of residence described herewith.

first-class workmanship from all their employees, and the quality of workmanship together with architectural features and economical arrangement of rooms make these homes most desirable for tenants and home-seekers.

An average dwelling of the smaller and less expensive of these being built by The Coquitlam Construction Company consists of one storey and five rooms, namely: Drawing room, 13 x 14; dining room, 13 x 13 feet; bedrooms, 10 x 11 feet; kitchen, 10 x 10 feet; a basement with a height of 7 feet and 25 x

One of the bungalows built by the Coquitlam Terminal Company.

35 feet in size. The outside measurements of a cottage of this type are 26 x 26 feet, and the height of the first floor is 9 feet.

The larger dwellings built and sold by this company have verandahs 8 feet wide, extending entirely across the front. In some cases a sleeping porch at the front entrance, the dimensions of which are 8 x 20 feet. All the houses will be heated by hot air and lighted by electricity. The front doors are of artistic cut glass set in panels. The front windows of the main floors are fitted with small lights set in wood bars for top lights.

The company has built twenty-three houses of a type similar to these shown. A number have been sold, while others have been rented at $15 to $25 per month. The sales are made on long terms and easy payments.

Efficiency Principles

The principles applied in a factory which adopts an efficiency system, stated briefly, are as follows:

1. Plan the work in advance, so that every man knows what he is going to do.
2. Make out a schedule of the work, so that it comes in an orderly way, and is properly timed.
3. Dispatch the work—that is, have a system that gets it where it belongs on schedule time.
4. Have conditions standardized with reference to the schedule of operations.
5. Standardize the operations.
6. Maintain a standard of practice and instruction.
7. Keep records of all operations—records that shall be exact, reliable, and available in time to be of the best service.

Sleds of the Yukon

The Yukon sled, while not a thing of beauty, is built to stand all kinds of hard wear, or, as the Irishman said, "It will last forever and after that can be used for firewood."

The sled is about eight feet long, is made of any kind of hard wood, lies close to the ground, costs from $10 to $14 and makes a trail sixteen inches in width.

Another pattern is known as the basket sleigh and is to the Yukon sleigh what a three masted schooner is to a coal barge. In length it is from eight to fifteen feet, is made of birch, oak or hickory, cuts a trail twenty-two inches in width, costs from $40 to $200, is raised a foot or more from the runners and in the best examples is lashed together with rawhide.

The basket sleigh, as its name implies, is fitted with a basket, into which the load is placed, and from the back of the basket a pair of handles project, to be used in guiding the sled on the trail. It often happens that a Yukon sled will be fitted with a home-made basket in imitation of its more aristocratic brother.

In very cold weather wooden runners are best, but in ordinary circumstances steel or brass runners are used.

Mr. W. A. Elliott, Toronto, manufacturer of The Elliot Woodworker, reports an increasing demand for this machine. To facilitate his sales, he has recently appointed the following agents: Mr. E. Cooke, 38 Burnside Place, Montreal; The Kent Gowan Company, Hamilton; and The Kingan Hardware Company, Peterborough. Business is particularly brisk in Montreal. Some of the most prominent firms who have lately installed Elliot Woodworkers are Messrs. Rutherford and Son (sash and door factory); Mr. C. F. Deakin (builder); and Messrs. Booth & Sons (sash and door factory). Mr. Elliot has his time fully occupied at present, but he hopes to take a trip West at an early date, with a view to establishing further agencies.

The News—From Coast to Coast

Zatz & Duloff, carpenters, of Montreal, have dissolved.

Chas. W. Strong, carpenter and builder, has registered at Montreal.

Chappell Bros., of Sydney, are building a sawmill at Grand Mira, N.S.

The Booth Felt Company intend to erect a paper box factory at Gananoque, Ont.

The National Lumber Company, Limited, Papineauville, P.Q., have obtained a charter.

The sawmill of the Smith Lumber Company, Woodstock, N.B., was burned recently.

A charter has been granted the Mississauga Pulp and Paper Company, Limited, of Toronto.

Jas. Gillies' planing mill at Preston, Ont., was destroyed by fire on May 1. Mr. Gillies will rebuild at once.

The Quinte Manufacturing Company, Limited, Picton, Ont., manufacturers of trunks, have sold to A. R. Wright.

A company has been organized to erect a chair factory at Scotstown, Que. Mr. M. G. Scott is one of those interested.

Fire caused damage to the extent of some $2,500 recently at the planing mill of S. R. Hughes, 79 Portland street, Toronto.

A combined rail machine of latest design has been added to the up-to-date equipment of the Reliance Sash & Door Factory, Vancouver.

One hundred and forty cabinet-makers and mill hands went on strike in Toronto on May 1st. Some 2,500 carpenters are still out.

The Knechtel Furniture Company, Limited, of Southampton, Ont., recently increased their capital from the sum of $750,000 to $2,000,000.

Chief Justice Falconbridge made an order on April 24th for the winding up of the Canadian Fibre Wood and Manufacturing Company, Limited.

Conner Bros., Limited, of St. John, N.B., have had their charter extended and can now conduct sawmills, woodworking, and pulp and paper plants.

The factory of the Megantic Furniture Company, Megantic, Que., was burned recently. The loss is estimated at $50,000. The plant will be rebuilt.

Nelson & Foster, 1398 Erin Street, Winnipeg, Man., are having plans prepared for a sash and door factory on William avenue, near Arlington street.

P. Cliche, of Beauce Junction, Que., will establish a broom factory at Lake Megantic. The town has lent him $7,000 and exempted him from municipal taxes.

Fire caused some $10,000 damage to the Gillies' planing mills at Preston, Ont., recently. Rebuilding is to commence immediately. The loss was partly covered by insurance.

The Restigouche Lumber Company, Limited, has been organized with a capital stock of $75,000. Their charter permits of their engaging in the lumber and wood-working businesses.

The Blue River Lumber Company, Limited, has been organized with a capital stock of $100,000. The head office is to be at the village of St. Mathias de Cabano, in the province of Quebec.

The McLaren Lumber Company of Brockville, Limited, has been incorporated with a capital of $75,000 to carry on business as saw and planing millers, dealers in timber, lumber and wood of all kinds, with head office at Perth, Ont. The provisional directors are Peter McLaren, J. L. P. McLaren and F. W. Hall, of Perth, Ont.

Bonne Bay, Limited, has been organized with a capital stock of $299,000, the head office being in Montreal. Their charter permits of their carrying on a lumber, timber and pulp wood business.

The Benton Pole and Lumber Company, with head office at Spokane, Wash., has been registered in B. C. as an extra-provincial company and will establish an office near Erie, in the Kootenay district.

The Cookshire Furniture Factories, Limited, will erect a plant at Cookshire, Que., to manufacture bedroom furniture. They will employ fifty hands and pay $25,000 annually. The town has guaranteed their bonds.

A new company proposes to build an up-to-date sawmill at Burnaby, B.C., at a cost of $85,000, provided that they are exempt from taxation for a period of ten years. This plant would employ about one hundred men.

The settlers in the Wharshan Valley, in British Columbia, intend to build a portable sawmill, on a co-operative basis, in the near future. This is to supply the settlers with the necessary lumber for building purposes.

The Devon Lumber Company, Limited, has been organized with a capital of $50,000. The head office will be at Ottawa. The charter provides for the manufacturing of all articles in which timber or wood can be utilized.

Robert Moodie, a prominent lumberman, of Port Moodie, B.C., intends erecting a large shingle mill and employing some seventy-five men. Orders have already been placed with the firm from various parts of the province.

Walter Lawson's sawmill at Stewarttown, Ont., was recently completely wrecked by a boiler explosion. Fortunately, none of the men working in the neighborhood were injured, although a number had miraculous escapes.

Amherst Pianos, Limited, has absorbed one of the largest piano manufacturing concerns in Toronto. The Toronto plant, together with the heads of departments, will be moved to the company's headquarters at Amherst, N.S.

The Bridge River Timber Company, Limited, was recently incorporated in B. C. with a capital of $350,000 for the purpose of carrying on a general lumbering and woodworking business. The head office is situated at Victoria.

The statement was recently made that the E. B. Eddy Company, of Hull, were discontinuing the pulp and wooden pail departments of their industry. It is now reported that in the wooden pail department only is manufacturing being stopped.

Among the recent incorporations in B.C. of interest to the woodworking trade is that of Ocean Mills, Limited, incorporated with a capital of $3,700,000 for the purpose of operating sawmills, pulp mills and woodworking plants in general. The head office of the company is at Vancouver.

Messrs. L., W. L., and J. A. Rawlinson, and Misses Margaret and Ethel Rawlinson, recently were incorporated under the name of Lionel Rawlinson, Limited, with capital of $100,000, for the purpose of manufacturing furniture and household furnishings. The head office is situated at Toronto.

McGill Chairs, Limited, is the corporate name of a new company recently formed with a capital of $100,000 for the purpose of manufacturing and dealing in chairs and furniture. The head office is situated at Toronto, and the provisional directors are Messrs. J. M. Duff, F. Regan and W. G. Hanna.

The new plant of the Pacific Box Company, Limited, at the north end of Connaught Bridge, Vancouver, is now be-

ing operated to full capacity. Jas. Sharpe, the manager, reports that he has had to turn down several good orders, and thinks it will be necessary to increase the output to cope with next year's business.

The Stanley Piano Company recently bought a reinforced concrete building at 349-55 Carlaw avenue, Toronto. The property is 150 x 400 feet and the building is of mushroom construction, with separate power house and outbuildings, kilns, etc. It is understood that the price paid was in the vicinity of $60,000.

Damien Lalonde, Limited, have been incorporated with a capital stock of $200,000, to deal in lumber and to manufacture doors, windows, sash, etc., and to carry on business as timber merchants and sawmill proprietors, with head office at Montreal. The incorporators are Damien Lalonde, Lionais and H. Lalonde, all of Montreal.

The Beaver Company, Limited, Thorold, Ont., are breaking ground for a mill and factory at that place for the reduction of timber and the manufacture of Beaver board. The plant will cost between $300,000 and $400,000. A total of 6,000 h.p. will be required in addition to 500 h.p. which will be used for the treatment of fibre.

The McAuliffe, Davis Lumber Company, Limited, Ottawa, Ont., are erecting a new warehouse and woodworking factory at their Chamberlain avenue yards, to replace the buildings which were recently destroyed by fire. They will install the latest woodworking machinery and will probably be in the market in the course of a few weeks.

R. Truax & Son, of Walkerton, Ont., are drawing up plans for a one-storey sash and door factory. The building will be 300 feet long x 60 feet wide with cement foundations and a cement floor 10 inches thick. The walls will be of brick 12 feet high. The factory will provide more room than the company have in their present place and will enable them to have all their machinery and workmen on one floor.

During the past month in B. C. the following companies have been formed for the purpose of engaging in the lumbering or woodworking industry: Marcuin Lumber Company, Limited; Vedder River Shingle Company, Limited; Boultbee, Johnson & Company, Limited; Shields Lumber Company, Limited, and the Knowles, Smith Lumber Company, Limited.

Visitors to the premises of E. C. Atkins Company, Limited, Vancouver, were amazed at the size of a saw being crated for shipment to an out-of-town mill recently. The big steel disc was 87-in. in diameter, and was fitted with inserted teeth of new design. The saw will be used by a shingle firm cutting from the log, and represented one of eleven similar saws being turned out of the company's shops under the superintendence of J. Whitten, formerly assistant superintendent of E. C. Atkins Company factory at Indianapolis, Ind.

R. A. Rastall & Company, who have a sash and door factory at 1074 Queen street east, Toronto, have been busy extending their plant this spring. They have added a moulding shed, 20 feet by 61 feet, the top storey of which will be devoted to a storeroom for sash, frames and doors. The company have recently put in a considerable amount of new machinery and equipment and they advise us that they intend putting in an additional sticker machine. About forty men are employed at the factory. Orders are coming in rapidly and the prospects were never brighter, according to Mr. Rastall, who, further continues that prices are likely to be well maintained and that the financial situation is showing signs of improvement. Last year the company took into their yard some six million feet of lumber. This is likely to be greatly increased during 1913 as the figures to date are much greater than those for the corresponding period of 1912.

The Late Mr. Daniel Simonds

We regret to record the death of Mr. Daniel Simonds, of Fitchburg, Mass., President of the Simonds Manufacturing Company, which occurred recently at his summer home at Larchmont, Long Island, N.Y. The company of which the late Mr. Simonds was the head are the largest saw manufacturers in the world and Mr. Simonds' death is a bereavement of an international character.

Doubtless many readers of the Canadian Woodworker will be interested in a few paragraphs extracted from the principal chapters of Mr. Simonds' life, and we have prepared the following material for the purpose:

Mr. Daniel Simonds was born in Fitchburg, Mass., on September 18th, 1847. After graduating from Comers' Commercial College, in Boston, Mass., he went to work for his father in West Fitchburg, making scythes and edge tools. In 1868 the Simonds Manufacturing Company was incorporated with a capital stock of $50,000, and the plant was then moved from West Fitchburg to its present location. The new company took over the business of Abel Simonds, the father of Daniel, and the latter entered the employment of the new firm.

He held various offices with the company and worked his way up steadily until in 1888 he succeeded Geo. F. Simonds as President. With Daniel Simonds at its head, the

The late Mr. Daniel Simonds

Simonds Manufacturing Company branched out from Fitchburg and installed plants in Chicago and Montreal. They also established works at Lockport, N.Y., and branch houses at New Orleans; Portland, Ore.; Seattle; Washington; London, Eng.; St. John, N.B.; and Toronto.

Mr. Simonds was a director of the Fitchburg National Bank and the Fitchburg Mutual Fire Insurance Company. He was a member of the Larchmont Yacht Club of Long Island, and of the Union League Club of Chicago. He was founder of the Manufacturers' Club of Fitchburg, and a member of the Fay Club, Aurora Lodge A. F. & A. M., and of the Board of Trade and Merchants' Association. He was also a prominent member of the Calvinistic Congregational Church.

Built-Up Veneers

A reader of the Canadian Woodworker in the Province of Quebec desires to get in touch with manufacturers of opera chair seats and backs built up of thin veneer.

BUYER'S DIRECTORY

AUTOMATIC DOVETAIL GLUE JOINTER
Canadian Linderman Machine Co., Ltd., Woodstock, Ont.

AUTOMATIC GLUE CLAMP CARRIER
Nels J. Billstrom, 1315 Tenth street, Rockford, Ill.

BABBITT METALS
Shurly Dietrich Co., Ltd., Galt, Ont.
Fay & Egan Co., Cincinnati, O.
Canada Metal Co., Ltd., Toronto.

BALUSTER LATHES
C. Mattison Machine Works, Beliot, Wis.
Thos. White & Sons, Paisley, Scotland.
Chicago Machinery Exchange, Chicago, Ill.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.
Canada Machinery Corp., Ltd., Galt, Ont.

BAND SAW FILING MACHINERY
Shurly Dietrich Co., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

BAND SAWS
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Shurly Dietrich Co., Ltd., Galt, Ont.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
R. H. Smith Co., Ltd., St. Catharines, Ont.

BAND SAW MACHINERY
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
H. W. Petrie, Ltd., Toronto.

BAND SAW MILLS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., Cincinnati, Ohio.

BAND SAW STRETCHERS
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

BENDING MACHINES
Fay & Egan Co., Cincinnati, Ohio.

BELTING
J. A. Fay & Egan Co., Cincinnati, Ohio.
Sadler & Haworth, Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
H. W. Petrie, Ltd., Toronto.

BELTS (Endless)
Candada Machinery Agency, Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Sadler & Haworth, Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
H. W. Petrie, Ltd., Toronto.

BELT CEMENT
Sadler & Haworth, Montreal.

BELT FASTENERS
Sadler & Haworth, Montreal.

BELT DRESSING
Sadler & Haworth, Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

BLOWERS
Sheldons Limited, Galt, Ont.
H. W. Petrie, Ltd., Toronto.

BLOW PIPING
Cyclone Blow Pipe Company.
Sheldons Limited, Galt, Ont.

BOILERS
Canada Machinery Agency, Montreal.
H. W. Petrie, Limited. Toronto.

BORING MACHINES
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Mussens, Limited, Montreal.
J. M. Nash, Milwaukee, Wis.
Valley City Machine Works, Grand Rapids. Mich.
H. W. Petrie, Limited, Toronto.

BOX MAKERS' MACHINERY
Canadian Linderman Co., Ltd.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.

BROKEN CASTINGS BRAZED—MACHINIST AND DIE MAKER
W. H. Dunne, 1492 Queen St. West, Toronto.

CABINET PLANERS
Canada Machinery Corporation, Ltd., Galt, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Agency, Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Valley City Machine Works, Grand Rapids, Mich.
Baxter D. Whitney & Son, Wichendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Ltd., Toronto.

CARS (transfer)
Sheldons Limited, Galt, Ont.

CARVING MACHINES
Canada Machinery Corporation, Ltd., Galt, Ont.
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Hespeler Machinery Co., Ltd., Hespeler, Ont.
Valley City Machine Works, Grand Rapids, Mich.

CHISELS
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

CIRCULAR SAW MILLS
Canada Machinery Agency, Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
H. W. Petrie, Limited, Toronto

CHAINS (Silent)
Jones & Glassco, Montreal

CLAMPS (Chain, Carpenter, Cabinet, Pattern Makers, Bench, Mitre, Piling, Mounted and Rotary Wheel)
Batavia Clamp Company.
Black Bros. Machinery Co., Mindota, Ill.
J. A. Fay & Egan Co., Cincinnati, Ont.

CLAMPS (Saw)
Shurly Dietrich Co., Ltd., Galt, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

CLUTCHES
J. A. Fay & Egan Co., Cincinnati, Ohio.

COLUMN CLAMPS
Black Bros. Machinery Co., Mendota, Ill.

COLUMN MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.

CORE BOX MACHINES
J. A. Fay & Egan Co., Cincinnati, Ohio.
Chicago Machinery Exchange, Chicago, Ill.
E. & B. Holmes Machinery Co., Buffalo, N.Y.

CUT-OFF SAWS
Canada Machinery Corporation Ltd., Galt, Ont.
Shurly Dietrich Co., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Berlin Machine Works, Ltd., Hamilton, Ont.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

CUTTER HEADS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Lamson Cutter Head Company.
Samuel J. Shimer & Sons, Milton, Pa.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

DADO HEADS
C. Mattison Machine Works, Beloit, Wis.
W. A. Elliott, Bathurst and College Sts., Toronto.

DIEMAKERS & MACHINISTS
W. H. Dunne, 1492 Queen St. West, Toronto.

DISK GRINDERS
J. A. Fay & Egan Co., Cincinnati, Ohio.

DOGS (Saw Mill)
J. A. Fay & Egan Co., Cincinnati, Ohio.

DOVETAILING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canadian Linderman Machine Co., Ltd., Woodstock, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

DOWEL MACHINES
Thos. White & Sons, Paisley, Scotland.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Dauber-Bell Machine Company.
J .A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Valley City Machine Works, Grand Rapids, Mich.

DRYING MACHINERY
Sheldons Limited, Galt, Ont.
Morton Dry Kiln Co., Chicago, Ill.

DRY KILNS
Sheldons Limited, Galt, Ont.
Morton Dry Kiln Company, Chicago, Ill.

DUST COLLECTORS
Sheldons Limited, Galt, Ont.

DUST SEPARATORS
Sheldons, Limited, Galt, Ont.

EDGERS (Gang)
Berlin Machinery Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

EDGERS (Single Saw)
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Agency, Montreal.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

END MATCHING MACHINE
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

ENGINES (Steam)
H. W. Petrie, Limited, Toronto.

EXHAUST FANS
Sheldons, Limited, Galt, Ont.

FLOORING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corporation, Ltd., Galt, Ont.
Baxter D. Whitney & Son, Winchendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

FLINT
Wausau Quartz Co., Wausau.

FLUTING HEADS
J. A. Fay & Egan Co., Cincinnati, Ohio.

GAINING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Canada Machinery Corporation, Ltd., Galt, Ont.
H. W. Petrie, Limited, Toronto.

GAS ENGINES
H. W. Petrie, Limited, Toronto.

GAUGES (Saw)
Shurly Dietrich Co., Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver B. C.

GLUE CLAMPS
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.

GLUE HEATERS
J. A. Fay & Egan Co., Cincinnati, Ohio.

GLUE JOINTERS
Canada Machinery Corporation, Ltd., Galt, Ont.
Canadian Linderman Company, Limited, Woodstock, Ont.
Chicago Machinery Exchange, Chicago, Ill.

GLUE SPREADERS
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

GRINDERS (Cutter)
J. A. Fay & Egan Co., Cincinnati, Ohio.

GRINDERS (Knife, etc.)
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

GRINDERS (Tool)
J. A. Fay & Egan Co., Cincinnati, Ohio.
Valley City Machine Works, Grand Rapids, Mich.

GROOVING HEADS
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Samuel J. Shimer & Sons, Milton, Pa.
Canada Machinery Corporation, Ltd., Galt, Ont.

HAND PROTECTORS
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Jones Safety Device Co., Hamilton, Ont.

HAND SCREWS
Black Bros. Machinery Co., Mendota, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

HEATING APPARATUS
Sheldons, Limited, Galt, Ont.

HANDLE AND SPOKE MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
J. M. Nash, Milwaukee, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.

HUB MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

HYDRAULIC VENEER PRESSES
Wm. R. Perrin & Co., Ltd., Toronto.

INJECTORS
H. W. Petrie, Limited, Toronto.

JOINTERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canadian Linderman Co., Ltd., Woodstock, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Plessisville Foundry, Plessisville, Que.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

KNIFE GRINDERS
Rogers & Coampany, Samuel C.

KNIVES (Planers and Others)
Shurly Dietrich Co., Ltd., Galt, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Samuel J. Shimer & Sons, Milton, Pa.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
H. W. Petrie, Limited, Toronto.

LACE LEATHER
Sadler & Haworth, Montreal.

LATHES (Pattern Makers')
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Valley City Machine Works, Grand Rapids, Mich.
H. W. Petrie, Limited, Toronto.
Thos. White & Sons, Paisley, Scotland.

LATHES (Turning)
Berlin Machine Works, Lid., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Valley City Machine Works, Grand Rapids, Mich.
Baxter D. Whitney & Son, Winchendon, Mass.
H. W. Petrie, Limited, Toronto.

LOOSE PULLEYS
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corporation, Ltd., Galt, Ont.

LUBRICANTS AND GREASES
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.

LUMBER
Anderson Lumber Company, C. G.
Elgie & Jarvis, Toronto.

MITRE MACHINES
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N. Y.
H. W. Petrie, Limited, Toronto.

MITRE SAWS
Shurly Dietrich Co., Ltd., Galt, Ont.
E. C. Atkins & Co., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corporation, Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

MITRE CLAMPS
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.

MORTISING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Jones & Glassco, Montreal.
Valley City Machine Works, Grand Rapids, Mich.
H. W. Petrie, Limited, Toronto.

MOTORS
J. A. Fay & Egan Co., Cincinnati, Ohio.

MULTIPLE BOXING MACHINES
J. A. Fay & Egan Co., Cincinnati, Ohio.
J. M. Nash, Milwaukee, Wis.

PACKINGS
Both Felt Company

PATTERN SHOP MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

PICTURE FRAME MACHINERY
Black Bros. Machinery Co., Mendota, Il.l
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.

PLANES
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corp., Ltd., Galt, Ont.

PLANERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

PLANING MILL MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Chicago Machinery Exchange, Chicago, Ill.
C. Mattison Machine Works, Beloit, Wis.
Samuel J. Shimer & Sons, Milton, Pa.
Baxter D. Whitney & Son, Winchendon, Mass.
Black Bros. Machinery Co., Mendota, Ill.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie Co., Ltd., Toronto.

POLISHING MATERIAL
Gray & Company, H.

PULLEYS
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

RESAWS
Shurly Dietrich Co., Ltd., Galt, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

RESAWS
H. W. Petrie, Limited, Toronto.

RIM AND FELLOE MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corp., Ltd., Galt, Ont.

RIP SAWING MACHINES
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Canada Machinery Corp., Ltd., Galt, Ont.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

SAFETY GUARDS (For Band Saw Machines, Jointers, Rip Sawing Machines, Shapers, Swing Saws, etc.)
Chicago Machinery Exchange, Chicago, Ill.
Fair Manufacturing Company, Racine, Wis.
Jones Safety Device Co., Hamilton, Ont.

SANDERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
J. M. Nash, Milwaukee, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Fisher Sander Co., Berlin, Ont.
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.
Elliot Woodworker Co., Toronto.

SANDPAPER
Black Bros. Machinery Co., Mendota, Ill.

SANDERS (Moulding, Belt and Panel)
Black Bros. Machinery Co., Mendota, Ill.
Chicago Machinery Exchange, Chicago, Ill.
H. W. Petrie, Ltd., Toronto.

SASH, DOOR INTERIOR TRIM AND COLUMNS
M. Brennan & Sons, Hamilton, Ont.

SASH, DOOR AND BLIND MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Samuel J. Shimer & Sons, Milton, Pa.
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.

SAWS (Hand)
Shurly Dietrich Co., Ltd., Galt, Ont.
E. C. Atkins & Co., Hamilton, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

SAW MILL MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
H. W. Petrie, Limited, Toronto.

SAW SWAGES, AUTOMATIC FILERS
E. C. Atkins & Co., Hamilton, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.

SAW TABLES
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

SCRAPING MACHINES
Baxter D. Whitney & Son, Winchendon, Mass.
Chicago Machinery Exchange, Chicago, Ill.

SCROLL SAWS
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Shurly Dietrich Co., Ltd., Galt, Ont.
E. C. Atkins & Co., Hamilton, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.

SECOND HAND MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
H. W. Petrie, Limited, Toronto.

SHAPERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Samuel J. Shimer & Sons, Milton, Pa.
Baxter D. Whitney & Son, Winchendon, Mass.
H. W. Petrie, Limited, Toronto.

SHAVING COLLECTORS
Sheldons, Limited, Galt, Ont.

SINGLE SPINDLE BOXING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.

STAVE SAWING MACHINE
Baxter D. Whitney & Son, Winchendon, Mass.

STORE FIXTURES, FITTINGS
Reflector & Hardware Specialty Mfg. Co. Chicago, Ill.

SURFACERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.
Chicago Machinery Exchangefi, Chicago, Ill.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

SWING SAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

TABLE LEG LATHES
Berlin Machine Works, Ltd., Hamilton ,Ont.
Chicago Machinery Exchange, Chicago, Ill.
Thos. White & Sons, Paisley, Scotland.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.

TENONING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
H. W. Petrie, Limited, Toronto.

TOOLS (Hand)
J. A. Fay & Egan Co., Cincinnati, Ohio.
Samuel J. Shimer & Sons, Milton, Pa.

TRIMMERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

TRUCKS
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Sheldons, Limited, Galt, Ont.

TURNING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.
H. W. Petrie, Limited, Toronto.

UNDER-CUT SELF-FEEDING FACE PLANER
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.

GUMMERS, ETC.
E. C. Atkins & Co., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

UNIVERSAL WOODWORKER PLANER
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
W. A. Elliot, Bathurst St., Toronto, Ont.
H. W. Petrie, Limited, Toronto.

VENTILATING APPARATUS
Sheldons, Limited, Galt, Ont.

VENEER DIERS
Sheldons, Limited, Galt, Ont.

VENEER PRESSES (Hand and Power)
Hydraulic Press Mfg. Co., Mount Gilead, Ohio.
Black Bros. Machinery Co., Mendota, Ill.
William R. Perrin & Company, Toronto, Ont.

VISES (Band Saws)
Shurly Dietrich Co., Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
H. W. Petrie, Limited, Toronto.

VISES (Pattern Makers')
J. A. Fay & Egan Co., Cincinnati, Ohio.

VISES (Circular Saws)
E. C. Atkins Co., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
H. W. Petrie, Limited, Toronto.

WAGON AND CARRIAGE MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.

WASHERS
Booth Felt Company

WASTE, COTTON
Gray & Company, H.

WIPING MATERIAL
Gray & Company, H.

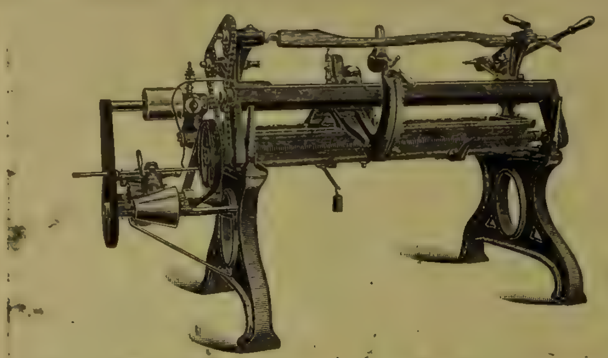
WINDOW FRAME MACHINERY
Smith & Phillips Mfg. Co., Chicago, Ill.

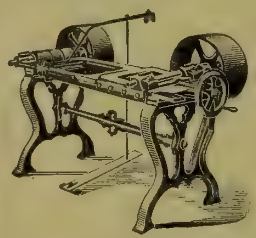
WOOD PULLEYS
Canada Machinery Agency, Montreal.

WORK BENCHES
Canada Machinery Agency, Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.

Volume Thirteen TORONTO, JUNE, 1913 Number Six

Canadian Woodworker





Are you a constant reader of the Canadian Woodworker?

As this issue has been sent to some woodworking and furniture factories besides the regular subscription list, and several hundred copies were purchased by one firm for distribution, some persons who read this page must give a negative answer to the above question.

Then, if YOU are not already a subscriber, look over the issue from cover to cover, note the interesting articles and advertisements relating to the woodworking industry, and remember that whether owner, superintendent, foreman or machine man, you can be benefited by reading your trade journal. It gives ideas and suggestions that will assist to eliminate waste, to reduce cost of production, to get better work and more work from your machines.

An investment of One Dollar, the price of a year's subscription, will pay large dividends. Six new subscriptions from any one factory, for Four Dollars and Fifty Cents.

CUT OUT FILL OUT AND MAIL THE FORM BELOW.

Date________________191__

Woodworker Publishing Co., Limited
Nicholls Building, Toronto

Please send the CANADIAN WOODWORKER to the undersigned for One Year, and thereafter until countermanded. Enclosed find One Dollar to pay subscription for first year.

Annual Subscription $1.00

Name______________________________

Position______________________________

Firm______________________________

Street Address______________________________

City or Town______________________________

Kindly write address plainly.

Canadian Woodworker

Canada's Only Woodworking Paper

Published in the interests of Planing Mills, Saw Mills, Furniture and Piano Factories, Implement and Carriage Works, Boxmakers and Coopers, Carpenters and Builders.

The Circulation extends from the Atlantic to the Pacific and covers thoroughly all classes of Woodworkers in this immense territory.

Wooodworker Publishing Co., Limited

Nicholls Building Toronto, Canada

United States: E. J. MACINTYRE, 659 Peoples Gas Building, Chicago, Ill.

SUBSCRIPTION RATE.

Canada, United States, $1.00; Great Britain, Australia 4s 6d.; other countries $1.50 per year. Advertising rates on request.

Vol. 14 June, 1913 No. 6

Encourage Employees

One of the important points in superintending a factory is the handling of men so that they will be satisfied to do faithful work. There seems to be an idea in some factories that it is better to hire new help than to give an employee a small advance in wages after he has proved he is worth it. It very rarely happens that a new beginner does not improve after he has worked on any line and if that person could be told that he was to get an advance in wages it would mean that his labors would be doubled to give satisfaction. Labor troubles of today have sprung up on account of workmen being dissatisfied, and there are many cases where the workman was justified in leaving his work. There should be an inclination in the factory to advance the workman who proves faithful.

Foremen should be allowed to praise the work of any person whom they find is doing well, and the best way to show appreciation is by a small advance in the day's pay. The foreman knows the condition better than any one else, and the firm should consider his approval. Superintendents who think that a continual grind on the working man helps the production, are wrong, and a good many of the labor conditions and labor troubles of today can be traced to superintendents who are largely at fault.

What advertising is to storekeeping, promotion and pay systems are to employment. Your advertisement makes the customer eager to buy; the chance of betterment spurs your men to eagerness in work.

A sound advertising policy courts permanent goodwill. Its tone never approaches "You've got to buy" or "Take your chances." Yet many employers head their man-handling policy with precisely those ideas. The time clock and the gang boss are trusted to build up the permanent, eager co-operation of help; or a rule-of-thumb is set for do-as-you-please service. And this in spite of the fact that only by making men desire to accomplish—only by hiring their minds and ambitions, can you command the momentum of their efforts.

Every man with a pay roll can afford to face frankly the fact that subordinates work for the same reason as managers—for permanent, cumulative advantage. As the executive sees the opportunity ahead, so the successful promotion plan advertises the worker's chance to him, makes it alluring even to the man of short sight, and sets his will persistently towards it.

Merit systems, like advertisements, rank according to their power to influence personality. Just as the copywriter bases his persuasion on the reader's self-interest, so the wise employer recognizes that promotion make-believes have their sure "come-back." His merit system, like his selling letter, is tested by its power (1) to get the attention of his men; (2) to awaken their interest; (3) to win their confidence; (4) to arouse their enthusiasm, and (5) to clinch their determination to advance.

Experience, however, teaches that any scheme of promotion must be its own advertisement. Make the merit scheme tell your men its own story—systematize recognition to effort in your most businesslike way—openly, quietly, solidly. Like a new business the merit plan has to establish its credit reputation by performance.

Building a promotion structure which will genuinely inspire the ambition of the personnel in office or factory, includes three processes:

1. Drawing up fair specifications and fixing a just valuation or wage for every position.
2. Measuring without prejudice by periodical inventory the growth every worker has made in value to you.
3. Positive recognition of such growth.

Keeping Track of Orders to Foreman

In a furniture factory that handles a wide variety of manufactured material, the manager formerly observed the customary routine and issued orders which he turned over to the foreman. The foreman then would keep these orders on file and put them on in the order in which they were received.

Orders are now made out on the annual order sheet, but to the sheet is attached a stub that gives the order number and a summary of it. This summary is left in the manager's office, where it is posted on a display board until the foreman actually puts the order in course of manufacture. When he does this, he goes to the manager's office, removes the tag and places it on his own board. As a consequence, his board shows at all times those orders in process of manufacture, while the manager's board shows all orders which have been issued and yet have not been started on the course of manufacture. Both the manager and the foreman, therefore, can plan their work accordingly.

Furniture Casters of Leather

Many furniture casters are now being made from leather by cutting disks of the required size, and cementing them together to form the wheel, which is then put into a lathe and turned until the face of the wheel is rounded. Disks of metal, fastened to each side of the wheel, provide bearings for the axle that runs through the wheel. This type of caster is made for use on hardwood floors, and casters of compressed felt are also manufactured for the same purpose. Other styles of casters include those of glass, designed for the purpose of insulation, and ball-bearing casters having no wheel, but a ball that revolves on a circle of smaller balls.

Modern High Grade Furniture Factory

An Establishment for the Production of the Best in Design and Workmanship—Finest Veneers and Hardwoods Used—Some Particulars of the Equipment—Off-shoot of an English Company

WHILE many Canadian firms are making furniture for the man in the street, there are of necessity but few which turn out the highest class of work. The great mass of people cannot afford to pay for special furniture; they have to be content with the goods—some of excellent quality—which are made from standard patterns and which serve the ordinary purposes. That there is a considerable demand for the best that can be produced is shown by the establishment in Montreal two years ago of the Bromsgrove Guild (Canada), Limited, under Dominion charter. The parent company, the Bromsgrove Guild, of Worcestershire, England, is recognized as in the front rank of British craftsmen doing the highest class of bronze and metal work and all interior and exterior decorations. Amongst well-known work executed by this firm are the magnificent gates of Canada and entrance gates to Buckingham Palace, London, and the best of the ornamental metal work and plaster work on the S. S. Lusitania. The Bromsgrove Guild (Canada), Limited, of 456 Clarke street, Montreal, had the advantage of starting with the experience of the English firm for their guidance, and this has resulted in the Canadian company becoming a financial success. Mr. Walter Gilbert, of Bromsgrove, is the president of the company; Mr. Jas. Gardner, vice-president; and Mr. E. L. Wren, managing director.

The aim of the directors was, and is, to manufacture the very highest class of furniture, correct in design to the old models and so constructed as to withstand the Canadian climate. It is known that much European furniture imported into this country will not stand the climatic conditions, and that a considerable amount of expensive furniture thus imported has collapsed after a very short time. The Bromsgrove Guild, while building their goods from first rate designs, avoid this fault by making the furniture on this side and suitable for Canadian conditions.

The British firm employ about two hundred men and artists, while the Canadian one has from seventy to eighty men, of many nationalities. Particular attention is given to carving and modelling, and the draughtsmen are chosen so that the work in any style generally in vogue may be carried out correctly. While some of the furniture is specially designed by the staff of the Guild, much of it is from architects' drawings for public buildings and for private clients.

View of Studio and Plaster Casting Shop—Bromsgrove Guild (Canada), Montreal.

Drawing Office

View of Mill, Showing Inside Dry Kilns

Hand Cabinet Shop

Corner of Upholsterers' Shop

Carving Shop

Corner of one of the Polishing Shops

VIEWS IN FACTORY OF BROMSGROVE GUILD (CANADA), LIMITED

Among the orders lately executed is furniture for the new board-room of the C. P. R., furniture for the president's office and waiting rooms, mostly executed in Australian black bean wood; furniture for the Regina Parliament Buildings, Art Association of Montreal, Mount Royal Club, Montreal Club, etc., etc. Some very fine chairs and billiard tables are now being made in the factory, the carving being exquisite..

Naturally it is essential that, in work of this description, only the finest veneers and hardwoods be used. This is obtained chiefly from I. T. Williams, of New York, although certain grades come from England. Mexican and Cuban mahogany, American white oak, American oak, English brown oak, Italian walnut, white mahogany, and satinwood are the chief woods employed, but work can be carried out in any hard and soft woods desired. On arrival, the lumber that will be soon required is kiln dried, being afterwards separated, and used as required, while that for use in the future is left to dry naturally as long as possible. The drying is a most important part in the making of good furniture, as any shrinkage means trouble sooner or later.

The managing director of the Guild invites customers to visit the factory and to see the furniture being made. They can, in this way, appreciate the care which is taken in carrying out their wishes and in building furniture which will last.

The company have a sample room in which is shown some of the products of the English house. These include fine specimens of lighting fixtures and metal work.

Owing to the peculiar formation of the building, it is impossible to describe the various departments in their order, but what follows will give a general idea of the scope of the Guild's operations. While a large amount of the work is done by hand, certain of the preliminaries are carried out by machinery of a modern character. The kilns are two in number, and have a capacity of 12,000 feet of lumber. When ready for use this is sent to the mill room, on the ground floor, where it is cut into various sizes and lengths by cross cut and rip saws, made by the Simonds Canada Saw Company, Montreal. Here, too, is a four spindle sticker machine, by Ballantine & Company, Preston Ont., and a 24-in. pony planer, made by the Crescent Machine Company, of Leetonia, Ohio, U.S.A.

On the next floor, in the joiners' department, (where a large amount of hand work is done), there are also several machines, doing the rougher part of the jobs, to be afterwards passed on to the joiners. These machines include a double shaper, by T. Robinson & Sons, Rochdale, England; mortising machine, the MacGregor Gourlay Company, Galt, Ont.; tenoning machine, Jackson, Cochrane & Company, Berlin, Ont.; cabinet maker's rip and cross cut saw, Crescent Machine Company; buzz planer, Ballantine & Company; pony planer, Crescent Machine Company; band saw, the MacGregor, Gourlay Company, and fret saw, Jackson, Cochrane & Company.

There are two carving rooms, and in one of these clay models of designs are made for customers' approval. The carving is of the best character, some of the designs being of a very artistic nature. Here one man is engaged on the legs of an exquisite table, another on a fine chair and yet another on the legs of a billiard table. In the cabinet making rooms it is all hand made work, every man engaged being qualified to do any job which requires skilled labor coming under this heading.

The wood is put in a specially prepared hot box just before gluing, so that there is no doubt of the joints standing. In one cabinet shop the large work is executed, while the other deals with the smaller class of furniture. Then there are the carpenters' shop and the polishing room. In the gluing room there are several presses and a core box. This room is kept at a higher temperature than the rest of the factory, it being necessary to keep it always very warm. The upholstering department uses only the highest quality white and double black drawing hair; the ticking, burlap and webbing is of the best quality and is imported

In the Joiners' Shop—Bromsgrove Guild (Canada), Limited

Table and Chairs made by the Bromsgrove Guild (Canada), Limited, for the new board room of the Canadian Pacific Railway at their new head office in Montreal. Executed in Australian Black Bean Wood. Table 17 feet long by 5 feet wide. Chairs covered in Canadian cow-hide, with hand embroidered crest on back.

direct from London, England, where it is made.

The company have also a plaster department in which plaster mouldings are made—some of intricate and ornamental designs. These mouldings are used for interior and exterior decorative purposes. One supplied to the Montreal Harbor Board, made in Portland cement, was of Neptune, six feet square, and is placed above the entrance to the freight sheds.

Both electricity and steam are used—the former for running the machinery and the latter for heating the offices and factory, supplying steam for the glue room and plaster-shop, the dry kilns, and hot boxes. The boiler is of 28 horse power and is chiefly fed by shavings. The electric power is obtained from the Montreal Light, Heat & Power Company, there being two motors supplied by Fred Thomson, Limited, of Montreal. On the ground floor there is also a well-equipped machine shop, equipped with an engine lathe, fitted up for twisted wood turning and for other work of a special character.

The entire factory is sprinkled on the dry pipe system, and further protection is obtained by the use of fireproof doors between the various departments.

The Toronto agents are Henry Hope & Sons, 45 King street west.

It may be added that the Bromsgrove Guild are agents for the Herter Looms, of New York, makers of artistic interior decorations, handwoven textiles for curtains, etc. This firm recently made fine historic tapestries and artistic furniture coverings for the New McAlpine Hotel, New York, the largest hotel in the world.

A Living Tower and How it Came to be Built

What is known as the "Living Tower" stands on the summit of a hill more than 200 feet high at Camp Meeker, a summer resort in Sonoma County, Cal. It was Capt. Meeker, a pioneer, who conceived the idea of constructing this remarkable tower on the summit of a hill near his hotel, and while looking around one day for a suitable site discovered four young redwood trees standing about twelve feet apart and representing a perfect square. Then it was, explains a writer in The Wide World Magazine, that the idea occurred to the captain to build a "living tower."

The trees were each about 150 feet high. Fifty feet of each was lopped off, and the work of building six storeys was then commenced. From top to bottom the "Living Tower" is 100 feet high. Each floor is about 12 x 12 feet, and rests on strong timbers, the ends of which are securely attached to the four trees by means of steel cables and bolts. So strongly was every part braced that the whole structure does not move as much as one would naturally suppose, even when rocked by heavy winds.

The tower has been carefully examined by builders and engineers, and pronounced perfectly safe. In the building great care was taken by the workmen to cut only the branches growing on the inside of the square, and the trees were not chopped, mutilated or weakened any more than could possibly be avoided.

Leading up from each storey are broad stairways, so that one may ascend and descend with ease and perfect safety, while around the edge of each floor are strong railings to prevent accidents.

Since this tower was completed, the trees have grown and flourished just as well as before. As time goes on, this unique lookout observatory will become literally embowered in foliage.

Hardwood is the greatest product known for interior trim and decoration, and the way to get more of it used is to keep driving this fact home to the public.

Disobedient

"Fweddy, why don't you let your moustache grow?"

"Why don't I let it? Good heavens, deah boy, I do, but it won't!"

Do It To-Day—To-Morrow Never Comes

The desire for immediate profit has been the cause of many a salesman sending a customer away with goods that would prove unsatisfactory in point of too much quantity or too little quality.

Care of Circular Saws in a Furniture Factory

By Walter C. Oberbeck

IN the following article I will describe the saws most used in the manufacture of furniture, and will endeavor to give whenever possible, an actual tracing of teeth of saws as to hook, spacing and depth. These saws are in daily use cutting such woods as ash, elm, the different kinds of oak, maple, birch, walnut and practically all kinds of mahogany and gum.

The swing cut-off saw arbor revolves at the rate of 2,750 r.p.m. and with a 16-inch saw this gives a rim speed of 11,519 ft. This may seem rather high to some machine operators but with a good arbor and a heavy frame it is safe. With a swing cut-off saw, speed and fast cutting go hand in hand.

Fig. 1 is a tracing of the teeth of a swing cut-off saw of a 13 gauge—16-inch saw with 88 teeth. The teeth are ground straight in front and bevelled on top. Use very little set and sharpen on circular saw sharpener grinding only on face of teeth; when done pull back the emery wheel, joint lightly, and file bevel on top of tooth. If care is used, you will have a round saw, fast cutting and one that will not crack easily as there are no sharp corners in gullets. These saws run on an average of one week before needing resharpening, when cutting kiln dried hardwoods.

Fig. 2 is a tracing of the teeth on a self feed ripsaw. They are 15-inch—14 gauge, with 36 teeth. These saws may be used for every wood except gum, which on account of pinching and twisting needs a heavier saw, say a 12 gauge saw with 30 teeth. These saws are ground on a circular saw sharpener, square in front and on top of tooth, with hook line half way between eye and rim. If you use spring set, grind until sharp then spring each tooth, using a set gauge, after which grind once around lightly to finish.

Sometimes when set is rubbed off in sawing sandy or gritty stock, the saw will heat in the cut and develop blue spots in saw. Take a straight edge and examine these spots and if you find a lump or ridge, level it. Then take a little muriatic acid and rub it over the blue spot, after which wash immediately in clean water to remove the effects of the acid. Saws placed in clean water for a while, will loosen the hardwood sap which bakes onto the plate, after which it may be brushed off with a stiff brush.

Fig. 2 is also a good style of tooth for hand rip saws. Rip saws will stand more tension than a cut-off saw, say 1-64 inch drop, when straight edge is placed from eye to rim and then pressed down.

Keep well leveled and run with as little set as possible as there is less strain on a saw with little set. A speed of ten thousand feet (10,000 ft.) rim speed is a good speed for rip saws. Keep feed rolls of self feed rip saws, sharp and in line. Keep collars on arbor clean and true. Do not allow the feed rolls to slip as it soon dulls your saw, to rub in one place in the cut. There is one species of mahogany, that, if your feed stops for an instant, away goes your swage or set, as if by magic.

Fig. 3 is a good style of tooth for groove saws up to one-half inch in thickness. There is plenty of gullet room to chamber saw dust and with hook line half way between eye and rim, it cuts easily. Swage lightly with upset, to give a little clearance on each side of plate. Figs. 1, 2 and 3 are saws which may be sharpened on a circular saw sharpener. Grind lightly so as not to case harden the gullets of tooth as it may cause cracks. Rather grind twice around lightly than once too heavily.

Fig. 4 is the common "peg" tooth and is used on double cut-off saws, mitre saws, and saws used for ripping veneered stock, where a common rip saw would tear out the face of stock. The teeth run in number from eight points to the inch, (as used on mitre saws, etc.) up to ¾ inch spring as used on double cut-off machines. As these saws are filed with a taper saw file, I gum out in gullet of each tooth over ⅜ inch spacing (as in Fig. 4). This does not allow the corner of file to touch the saw. What do I gain?—Well, the saw files a great deal easier, faster

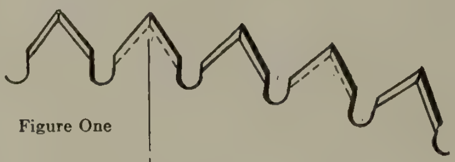


Figure One

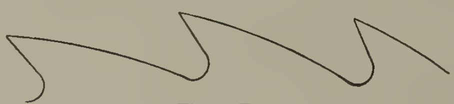


Figure Two

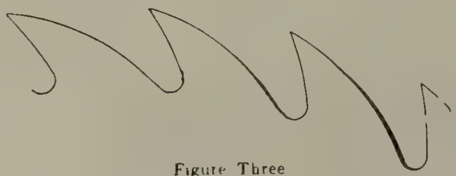


Figure Three

Tension just enough so that saws level nicely and keep free from lumps and ridges. The end wood of hard maple when glued up of one inch stock, makes a good leveling block.

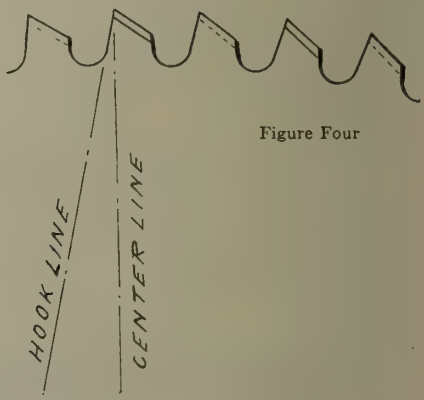


Figure Four

and the files last nearly twice as long; the saws cut easier, and do not crack. Worth trying, isn't it?

Use an eighth-of-an-inch emery wheel to gum out with. In jointing circular saws, joint on arbor while in motion whenever possible. Bring saw table level with top of saw, start saw in motion and rub a piece of emery wheel over table, touching tips of teeth very lightly. If care is used you will have a saw which cuts in a circle. Always put saw on arbor in same position using trade mark of saw to go by.

Canada's Largest Handle Factory

ONE of the oldest established and most flourishing industries in St. Thomas, Ont., is that of the J. H. Still Manufacturing Company, Limited. Besides being one of the pioneer industries in that city, this firm's factory was the first to manufacture handles in Canada and still does quite 50 per cent. of the handle manufacturing business in this Dominion. Originally established at Tilbury by the late J. H. Still, father of the present head of the firm, the plant was moved to St. Thomas about 26 years ago and was then located on Wellington and Railway streets. Following the destruction of the plant by fire, about 15 years ago, the business was removed to its present location on Elm street. Since then the business has grown in importance and volume; new machinery and facilities being added, until to-day it is one of the busiest manufacturing concerns in the province.

The firm manufactures handles of all kinds, including sledge, axe, pick, hammer and shovel. Also pike poles, peavey handles, whiffle-trees, double-trees, horse pokes and hockey sticks. Their sledge, axe, pick and hammer handles are made from hickory, which comes from the Southern States, but is cut and seasoned at the factory. The whiffle-trees, fork handles, shovel handles and most of the pike poles are made of white ash. Pick handles, cant-hook and peavey handles and also some of the pike poles, are made of maple. Hockey sticks and double-trees are made of rock elm, while soft elm is made up into horse pokes and box lumber for casing up the handles manufactured.

With the rapid disappearance of the hardwood forests of Ontario, the firm has had to go further and further afield for its hickory, the principal source of supply being the State of Arkansas. The Canadian forests have been pretty well cleared out of this timber and what is left is not worth cutting.

There is a heavy foreign demand for the hickory handles made by this firm, and large shipments are made annually to New Zealand, Australia, Newfoundland, South Africa and Great Britain,—the first-named being the largest buyer of these goods.

The process of manufacture is briefly as follows:—

When the lumber arrives it is put into sheds and allowed to dry until it is thoroughly seasoned. Afterwards it is taken into the factory and cut up, trimmed off to the right length and turned on the lathes. It is next put on the grinding belt, after which it is taken to the finishing belt which smoothes it up. It is then placed on the polishing belt which gives it the finishing touches. It is now the finished product and is ready to be packed for shipment.

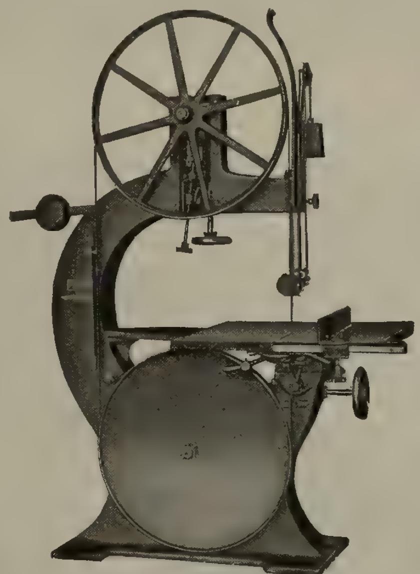
J. H. Still Manufacturing Company are the largest concern in this line in Canada, and their business is constantly expanding. They are very busy just now and their plant is taxed to its full capacity, while Mr. Still states that the firm will do at least one-third more business this year than it did in the last twelve months. The firm employs a force of about seventy-five men, in the winter season this is augmented by teamsters and men at work in the woods getting out timber.

The firm last year purchased from the city the 200 horse-power Wheelock power engine, which was used in the municipal gas plant prior to the coming of the hydro-electric power. The growth of this concern has in a large measure contributed to the development and upbuilding of the south side of the city; new streets being opened and rows of fine residences springing up all around the big handle institution.

Mr. Still gives his personal supervision to every branch of the business, and allows nothing to go out of the factory that is not in first-class shape.

Improved Band Saw

Among the recent improvements in woodworking machinery is the No. 712 Band Saw manufactured by the Canada Machinery Corporation, Limited, of Galt, Ontario, which is illustrated on this page. This machine embodies many improvements of practical value which enable it to turn out more and better work



An Improved Band Saw

than machines of the older type. The straining device is very sensitive, being of the knife-edge type, and eliminates almost completely the breakage of saw blades.

The main frame of this machine is a heavy cored casting of exceptional strength, and the floor base is of ample proportions to ensure freedom from vibration. The wheels are 36-in. diameter and 2-in. face. The upper wheel is hung on a knife edge and is as light in construction as is consistent with the strength required. The lower wheel has a solid web centre, and being heavier than the upper one controls the movement of the same. The shafts run in self-oiling adjustable bearings. The table tilts in a semi-circular bearing and can instantly be clamped in any position.

This machine will take 15-in. stock below the guide.

Woodworking Factory Second to None

Description of the Extensive Plant of James Davidson at Ottawa—From the Stump to the Finished Product—Superiority in Construction Equipment and Operation

The Ottawa Valley has long been famous as a lumbering centre, although the quantity of available timber has been greatly lessened by the lumberman's axe. It is not surprising that we should find located at Ottawa one of the best woodworking establishments in Canada—a plant which in point of arrangement and equipment it would be difficult to excel. This woodworking establishment is the outcome of the enterprise and labors of the late James Davidson, who passed to the Great Beyond in October of last year. Although three times the factory was wiped out by fire, the late Mr. Davidson and his brother-in-law, the late Wm. Thackeray, re-built it each time. On Mr. Davidson's death the management of the plant was taken over by his aldest son, Mr. Grant P. Davidson, and the business is now conducted under the name of the Estate of James Davidson. Mr. Leander Henderson is superintendent of the saw mill and factories, and Mr. A. G. Rose is secretary-treasurer. Both of these gentlemen have been connected with the business for many years and are able assistants to the manager.

The timber limits now owned by the company consist of some 150 square miles, situated on both sides of the Coulonge River and heavily timbered with white and red pine, spruce, cedar, basswood, oak, birch, maple and ash.

The sawmill is situated at Davidson, Pontiac, Quebec, at the junction of the Coulonge and Ottawa rivers and on the line of the Waltham Branch of the C. P. R., about eight miles above the City of Ottawa. This village was established in 1900 as the result of the lumbering industry carried on by Davidson & Thackeray, of Ottawa, and now controlled exclusively by the Estate. Here are located the buildings and other necessary facilities, including saw, shingle and lath mills, offices, workmen's house, stables, ice-house, blacksmith shop, boom house, private railway station, railway sidings, etc., all built in a sixty-acre reserve. Outside the mill property is the general store, post office, Dominion Express office, hotel, etc., controlled by private parties.

The Factory

Most of the lumber manufactured at Davidson is utilized in the immense woodworking plant at Ottawa. The factory at Ottawa, as it stands today, was completed in 1905 and is a monument to the enterprise and genius of the late Mr. Davidson. It is without doubt one of the largest and most modern woodworking establishments in Canada. The capacity of the door department is a door a minute. This, however, is only one branch of the business, as the manufacture of sash, blinds and mouldings, flooring, sheeting, boxes, and box-shooks, clapboards, stair work, refrigerator and toboggans is very extensively carried on.

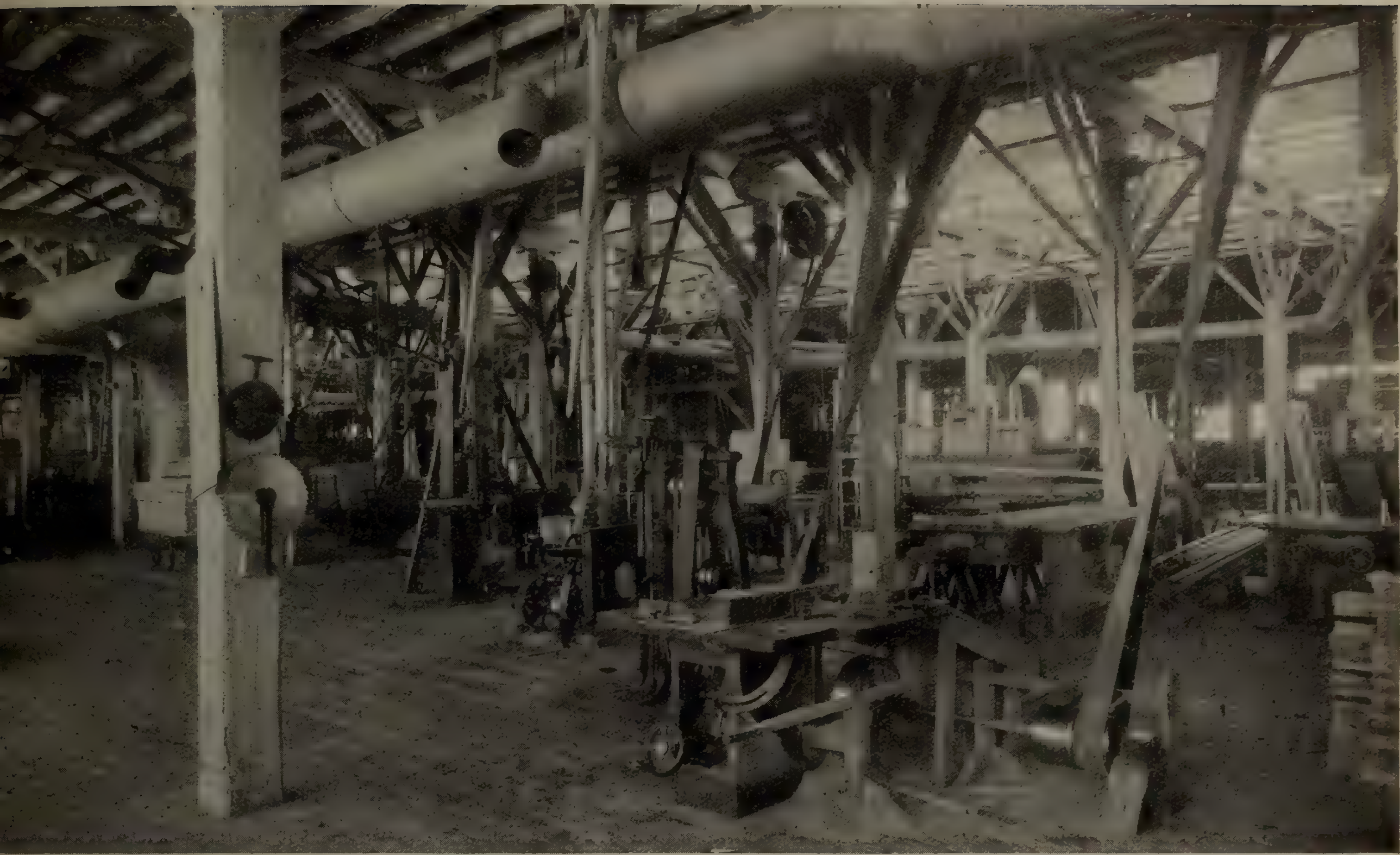
Four acres of ground are occupied by the factory and warehouse buildings, including lumber and stock sheds. It faces on the tracks and terminals of the Canadian Pacific and Grand Trunk Railways, giving ample opportunities for unloading cars. The mill, dry-houses, and engine and boiler houses are constructed of brick and are as nearly fireproof as it is possible to make them. The plant and offices are also equipped throughout with an automatic sprinkler system, installed by the Vogel Company of Canada, Limited, Montreal.

The power house is of brick, 40 x 60 feet. It contains a Goldie & McCulloch latest improved Corliss 25 x 48 engine of 750 h.p. and five large boilers 6 x 16, manufactured by W. G. Campbell, of Ottawa, is equipped with Fleming Hollow Grate Bars and a special design of furnace for burning shavings, cuttings, etc. A part of the power house consists of a shavings vault 60 feet high and 40 x 30 feet. On top of the shavings

Grant P. Davidson, Manager.

A. G. Rose, Secretary-Treasurer.

Leander Henderson, Mech.-Supt.



View of machines in plant of Estate of James Davidson, Ottawa

Behind the moulders—Factory of the Estate of James Davidson, Ottawa

vault is a separator eight feet in diameter and 16 feet high and another on the main mill is 12 feet in diameter. These separate the sawdust from the shavings. The sawdust goes into bins directly over the boiler.

The mill proper is 300 x 200 feet, with an "L" 75 x 200 feet. The dry-houses are 75 x 100 feet. One lumber shed is 22 x 400 feet, while the moulding building is a double shed 80 x 200 feet. The stable is 24 x 70 and has accommodation for twenty horses. There are private sidings on the Canadian Pacific and Grand Trunk railways. From these sidings wagons are loaded with material incidental to the sash and door business, which goes directly into the dry kiln. This dry kiln, which, like the mill and office, receives its heat from steam supplied by the boilers, has a capacity of 100,000 feet. It was installed by Sheldons, Limited, of Galt, Ont. From the kiln, the doors of which open immediately into the factory, the lumber passes through a No. 90 new Berlin Fast Feed Double Surfacing Machine. From this machine it progresses rapidly to others, all set and arranged so that the material is handled without loss of time or waste of motion. Passing from the planers it is transferred to some of the several rip or resaws via automatic tables where cut-off saws divide it into desired lengths, and from there to others of the numerous machines which fill the main floor of the building. Much of the finished product is manufactured almost entirely by these machines, tended by skilled machine hands. Other work may, however, be so elaborate and delicate in its nature that it must be executed mostly by hand and for this work a large number of skilled hands are required.

View of Main Corridor—Estate James Davidson.

The blower system, installed at a cost of $7,500 consists of numerous pipes so arranged that the dust, shavings, etc., are drawn into them directly from each machine and by suction drawn into main pipes leading to a reservoir known as the "cyclone," from which the waste is automatically fed to the furnace. Heat goes through all buildings and office. The heating and blower system was installed by the B. F. Sturtevant Company of Boston. It includes a standard 150-inch fan of the three-quarter housing type, driven by horizontal centre crank engine having seven-inch cylinder and arranged to draw the air through a heater containing twelve standard four-row sections. The air is distributed first through an underground tunnel and thence discharged into an overhead system of galvanized iron piping, carried in each wing of the building. The most important feature of this system is that all of the heating surface is massed in a single casing placed entirely through an extended system of overhead piping with its downward discharging pipes.

Door Department—Estate James Davidson.

In the "L" on the main floor are located the heating and glue rooms. These are equipped with more than the ordinary amount of steam heated pipes, warmth being a requisite for successful glue work, of which much is done in the production of fine veneered material.

The Planing Mill

The equipment of the planing mill consists of one No. 90 Berlin Fast Feed Planer and Matcher with complete equipment of profiling attachments, and one special hardwood flooring machine made by Hoyt & Brother, Aurora, Ill. Connected with this machine is a self-operating cross-cut saw and an end matcher. In this department are also a large re-saw made by the W. B. Mershon Company, Saginaw, Mich., an S. A. Wood double surfacer, as well as a Gregor-Gourlay gang-rip saw, two Berlin Machine

Corner of Box Shop—Estate James Davidson.

Works Stickers, dowel pin machine and two power feed rip saws for ripping the moulding stock for the stickers.

All the moulding comes uncut from the kiln to the power feed saws. This does away with any additional handling whatever, as the operators take the lumber from the cars as they are wheeled out of the kiln, thus saving a large amount of work every day that would otherwise be necessary. All lumber for the department is sorted under cover or in the mill proper. Lumber coming up for the kiln is loaded directly off the sleighs or wagons on to the cars or in the dry kiln, and after drying, these cars are taken on trucks into the mill and to the particular department for which the lumber is intended, a very economical and satisfactory arrangement.

The Door Department

In the door department, as in all other departments, economy in production has been secured. From the drays, the lumber is loaded on to large trucks in the kiln and, after being seasoned, passes through a dry-shed to the main building and to the door department without having been handled again. The lumber is planed by a No. 186 double surfacer made by the Berlin Machine Works, of special design for dressing up door stock. From the door planer the lumber passes through rip-saws, after which it goes to self-operating cut-off saws made by E. B. Hayes of Oshkosh, Wis. All the material is handled from trucks to machine to trucks, thus ensuring a minimum of handling. The equipment for manufacturing doors, consists of two complete sets, one of dowel door machinery and the other for all other classes of doors. These machines are so placed that the material passes from one to the other in natural sequence,

From the cut-off saws some parts go to the double-end borer, made by the E. B. Hayes Company. The stiles go to the stile borer, where they are bored, and the rails to the rail borer. The latter then go to the automatic glueing and dowel driver where the dowel pins are inserted automatically, and glued. The operation leaves them ready for the door power clamp machine. After clamping, the doors are all handled by a Berlin 48-inch latest type of six drum sander. This machine sands the doors on both sides with one operation which means a great saving in handling. The better class of doors, as odds, go through a single-end tenoner, door sticker, chisel mortiser, chain saw mortiser, relisher and door clamp. These, with the exception of some lighter saws, include the equipment of the door department.

The Sash Department

The material for sashes goes through almost the same process as that for doors. The equipment includes single and double-end tenoners, chain-saw mortiser, sticker, relisher and boring machine. The machinery in the window and door frame department includes cut-off saws, rip-saws, window pocket machine groovers, beaders, and a large double headed machine for checking the head and jambs of door frames at one operation. Besides these, are a drum and disc sander, combination iron saw tables for mitering, leveling, etc., three buzz planers or jointers and a 30-inch double surfacer, also a number of carpenters' benches for the manufacturing of office and shop fittings, counters, etc. The material of this department is sanded by a Berlin 72-inch three-drum sander.

A cabinet and joinery department has just been completed as an extension to the joinery department, at a cost of $10,000. This building will be used for

Interior of Lumber Shed—Estate James Davidson.

cutting up various kinds of hardwood, also for storage of kiln-dried hardwood.

The Box Factory

The box factory is a building 100 feet square. The machinery in this department is all of a special nature, the most noticeable of which is a box nailer from the Morgan Machine Company, Rochester, and a box nailer from the Doig Est., New York; a machine for driving corrugated fasteners; a Berlin Horizontal re-saw, hopper feed; a Berlin power feed double cut-off saw; a Connelly and Dengler printing press, as well as one from the Morgan Machine Company; two power box board squeezers from the Mereen Johnson Company, of Minneapolis; six sets of rip and cross-cut saws; two Morgan power tongue and groove machines, and a Morgan complete set for making beer and ginger ale cases, of which the firm make great quantities, both nailed and in shook form in carload lots. In connection with this an 8-foot Linderman dovetail machine is used for making ends for boxes.

The Filing Room

The grinding and sharpening equipment is in keeping with the modern ideas followed throughout the entire plant. Besides smaller machines, there are to be found here, a band re-saw grinder, automatic circular grip grinders, a large machine for grinding planer knives and an automatic grinding and setting machine for small band saws used in scroll work. A machine shop has also been added, equipped with two iron working lathes; one large power feed drill; one high-speed shaper and one horizontal planer. Five men are constantly employed and all the repair work of the mill at Davidson is done here.

The Lumber Sheds

The quantity of lumber carried in stock is well over a million feet, all of which is under cover. The sheds occupy the two sides of a rectangle 300 x 400 feet. They are 18 x 20 feet deep and 20 feet high. In the centre is another, 100 x 25 feet, with a plank driveway through the centre, 22 feet wide. One side of this shed has been decked, principally for dressed stock such as mouldings. This shed is one of the best of its class in Canada.

Electricity is used to light the various buildings, lumber sheds, etc., upwards of 500 lights being required for the purpose. Every detail about the whole plant has been worked out so as to secure the maximum of production at the minimum of cost. All the machinery in the entire wood-working factory was installed under the supervision of the superintendent, Mr. Henderson, one of the most competent superintendents in Canada.

Rip-Saw Work

EFFICIENCY in rip-saw work is just as important as efficiency in saw milling, planer work or any other machine wood-workin, and it is now a larger subject than formerly by virtue of the simple fact that the rip-saw is entering more extensively into the work of manufacturing and refining lumber. The rip-saw enters into the manufacturing and utilization of lumber as a single side edger, as a gang edger, as a plain hand feed and power feed rip-saw, and in the factory at times as a sort of universal machine.

Where there is any quantity of work to be done it is a waste of time and energy to fool along with a hand feed rip-saw. The power feed machine is inestimably faster, and if the power feed rig has a roller both in front and back of the saw it is an unusually safe device for the operator to handle.

There is shown in connection herewith a view of a good type of power feed rip-saw working hardwood. The main object in offering this picture is to illustrate the subject of auxiliary attachments to the ordinary rip-saw table to get increased efficiency, to make the work safer and better. In front of this machine to the right of the picture is an infeeding table rest that supports the ends of long boards and relieves the sawyer from having to hold them up while they are feeding into the machine, while back of the machine is another table which supports the outfeeding ends in a similar manner. The tables are made portable so that in case there is a run of short stock they can be moved out of the way, or for extra long stock they can be moved back a space so as to support the additional length. In this instance the back table is a little lower than it need be. An outfeeding table should be just low enough for the stock to pass on to it easily from the saw table, for if it is too low it fails in its mission, which is to support the ends of the stock feeding out and prevent the weight of the outer end making a lever of the stock and tends to lift the weight of the feed rolls.

The different local requirements call for variations in the arrangement of auxiliary tables, but in some form or another these can always be used advantageously in connection with rip saws. It is simply a matter of putting in the rip saw in practically the same way the average mill gang edgers are installed, with tables in front and back, with the difference that the auxiliary tables on the rip saw are made portable. They can be moved away for convenience in working short stock. They enable one to get a greater efficiency out of the rip saw, and they help make rip-saw work less dangerous.—Hardwood Record.

The only road to advancement is to do your work so well that you are always ahead of the demands of your position. Our employers do not decide whether we shall stay where we are or go on and up; we decide that matter ourselves. Success or failure is not chosen for us; we choose for ourselves.

The Advertiser's Creed

I believe in publicity and in every legitimate method of catching the eye and reaching the ear of any possible customer.

I believe that repetition must result in emphasis, that emphasis must in time attract attention, that attention must create interest, that interest must yield orders.

I believe that the way to sell goods is to advertise them, to tell people about them continually, to talk straight and to talk honest

I believe that the market is as big as the world, that a slice of it belongs to me, that my goods are worthy of it, and that I am going to get it.

Douglas Fir as a Building Material

THE properties and uses of Douglas fir are interestingly set forth in Bulletin 88, which has just been issued by the Forest Service of the United States Department of Agriculture. The exhaustive series of tests presented were made in the laboratories of the Forest Service and the results are of special interest to the users of structural timber. The facts presented in regard to the commercial uses of the timber have been gathered from lumber manufacturers and other industrial concerns that use Douglas fir, which, in passing, it may be stated, is regarded as the most important of American woods. It is manufactured into almost every form known to the sawmill operator, and much round or hewn timber is used which never passes through a sawmill.

For house construction Douglas fir is manufactured in all forms of dimension stock, its strength and comparative lightness fitting it for joists, floor beams, rafters and other timbers which must carry loads. The comparative hardness of the wood fits it for flooring, and Douglas fir edge-grain floor is often considered superior to that made from any other American soft wood, it being used on the Pacific Coast to the exclusion of nearly all others. Fir comes in direct competition with Sitka spruce and Western red cedar in the manufacture of beveled siding, and it generally yields to them where they are conveniently had.

In the Northwest, where the merits of Douglas fir are best known, the wood has recently gained an important place for finish. Clear lumber, sawed flat grain may be more strongly brought out and a number of costly woods can be successfully imitated. Its chief use is for door and window casing, base boards, panel work, etc.

The best grades of "yellow fir" lumber are used for sash and door work, and for this purpose it competes in the Northwest with spruce and Western red cedar.

Douglas fir is also made into rotary-cut veneer, which goes chiefly into the manufacture of door panels. The logs intended for veneer are steamed about three days to soften the wood and make it easier to cut.

A list of the forms and uses to which Douglas fir is adapted would represent many industries and would include mine timbers, bridge and trestle timbers, railway ties, timbers for car construction, material for the furniture maker and boat builder, special products for tanks, boxes, pulpwood, fuel and a long line of miscellaneous commodities, including wood for distillation.

Facts About Some Precious Woods

The best known grade of cocobolo grows in Central America and is shipped from Panama. This is a slow-growing, very hard, bright red wood, one of the brightest woods of commerce. The sapwood is yellow and quite heavy, an average sized log having about two inches. After being cut in the forests, the logs are chopped into short lengths, usually not over three or four feet, presumably to facilitate handling, as the wood will sink in water, making it impossible to float the logs down the rivers to the seaport. Many of the pieces become split and wormy, and a lot of this wood on being received is made up of billets of all shapes, weighing from thirty to four hundred pounds each.

Ebony

Ebony is well known as a precious wood. It is one of the hardest woods in existence and very heavy, sinking quickly in water; but unlike cocobolo, which has large pores and is of a tough, fibrous nature, ebony has very dense, close pores, and is of a brittle hardness, and consequently takes a high polish.

The best grade, known as Madagascar ebony, is jet black, and comes from the west coast of Madagascar. The end of a freshly cut log makes a striking appearance, as the sapwood is white and sharply defined against the jet black heartwood. This sapwood is nearly all adzed off before the wood is shipped, giving the logs somewhat the appearance of charred pieces. As the wood is received, the logs are from four to ten inches in diameter, by from four to eight feet long, and weigh from fifty to one hundred and forty pounds each. As the hearts of the logs are generally defective, much waste results in manufacturing.

The other most important classes of ebony are Tamatave and Gaboon ebony. Tamatave ebony grows on the east coast of Madagascar and is purplish-black in color. In size it is somewhat larger than Madagascar ebony, the logs averaging from 200 to 250 pounds each.

The source of Gaboon ebony is the northwest coast, or tropical part of Africa. This wood is grayish-black, with occasional light-colored streaks running through it. The logs are prepared for market by being cut into sections, thus excluding the heart, which is of no use. All sap is removed, and the wood is received in the shape of billets of from thirty to one hundred pounds in weight. All ebony is very slow-growing, a tree giving an average sized log being one hundred years or over in age.

Lignum-Vitae

Lignum-vitae is generally considered to be the hardest wood in existence. The main sources of supply are Hayti, Mexico and Cuba. The color varies from dark brown to a dark greenish-brown. The wood from Hayti is the poorest quality, and nearly all of the supply is used for casters for furniture. An average sized log is eight inches in diameter by three feet long, this including from one to two inches of sapwood. Mexican lignum-vitae is next in quality, being generally sounder and larger, but logs have a heavy sap, which is light yellow in color, and cannot generally be used, as it is softer than the heartwood. The lignum-vitae grown in Cuba is very much superior to either of the other named grades, both in quality and size. Logs run from six inches to thirty inches in diameter by from four to ten feet long, an avearge log being twelve inches in diameter. This wood is greenish in color, and has a very thin sap. The logs measuring from eight inches to twelve inches in diameter inside the sap are called "ball-wood," and are manufactured into bowling balls. The larger wood is used in different kinds of shipbuilding. A piece of wood broken from a log shows a wavy, interwoven grain, and is very oily. The wood sinks in water almost as quickly as a stone.—Hardwood Record.

Circassian Walnut

The high cost of Circassian walnut is due to the scarcity of the beautifully figured variety demanded for furniture and interior finish, for the tree itself is more widely distributed than almost any other of commercial importance. The demand for the best wood, however, has always outrun the supply. Even in the eighteenth century, when wars in Europe were frequent, so much Circassian walnut was used for gunstocks that the supply was seriously depleted. Early in the nineteenth century the wood of 12,000 trees was used for this purpose alone.

Brilliancy and Lustre of Varnishes

Everything Depends on the Nature of the Resin—Four Interesting and Instructive Experiments

AN English work on varnishes gives the following points on brilliancy and luster: "Brilliancy and luster depend on the nature of the resin. The greater the ratio of resin to oil, the greater is the brilliancy and luster of the varnish. As a matter of fact, the brilliancy of a varnish is a property dependent on its index of refraction. As the index of refraction of a resin is greater than that of linseed oil, the more resin there is in a varnish the more lustrous it is. Hence the reason why spirit varnishes, after drying, are more lustrous than oil varnishes. Each unit per cent. of oil in the dried coating of an oil varnish diminishes its luster pro rata. On the other hand, even if it increases the luster proportionately, each unit per cent. of resin in varnish, after a certain amount, diminishes its durability pro rata. A compromise has therefore to be made according to the object in view in designing a varnish for any given purpose. Where brilliancy is a desideratum the resin must not be less than one-third to one fourth by weight of the dried coat. But where brilliancy leave off, durability is only beginning, and varnishes in which the resin only form one-fourth of the dried coat are used where great elasticity is demanded. In the case of a piano varnish, for instance, durability is, to a certain extent sacrificed to lustre, and the percentage of resin to oil preponderates in such a varnish. The harder the resin, the greater the brilliancy. A Manila varnish made with the same number of gallons of linseed per 100 pounds of Manila is less lustrous than one made in the same ratio of oil to resin from Zanzibar copal. It is asserted that the index of refraction of a varnish is greater than that calculated from its composition, but this may be due to a turpentine residum left out of the calculation. Be this as it may, the skill and care with which a varnish is made are factors which cannot be lost sight of in any investigation into the cause of the brilliancy of varnish.

"Durability and resistance will vary with the proportion of linseed oil and the elasticity of its oxidation product. Varnishes should embody the brilliancy of the resins and the elasticity of the drying oils."

Experiments are described on the improvement of varnish by heat and also by aging, and much information is given relative to the constituents of carriage varnishes and similar materials. Numerous experiments are described and their results given, and we quote four of these, which may be taken as fair specimens of the whole.

Experiment IV.—That too much driers in varnish renders it opaque and unfit for delicate colors. One day I varnished two panels got up and glazed with a very rich crimson lake. No. 1 was varnished with body varnish made entirely from African copal without any driers whatever either in the clarified oil or boiling; No. 2 was varnished with "body" of the same gum, age and proportion, but with a small quantity of dried sugar of lead and dried white copperas. The panel No. 1 dried in nine hours and remained tacky for five hours more; the panel No. 2 dried in seven hours without tack. In a day after both panels were flatted down and varnished and repeated until each panel had four coats of varnish. The varnish was eight months old and dried in the same space of time. I hung both up for a month and then polished them and examined them with a microscope, when the panel No. 1 appeared quite clear in color, solid and brilliant like plate glass, but No. 2 had changed a little in color, inclining purple, and in the varnish were almost imperceptible opaque points. I kept these two panels for two years afterwards; when I examined them, there appeared no decay in No. 1, but in No. 2 the driers were perceptible on the surface with the naked eye.

Experiment V.—That moist driers boiled in varnish cause it to run in pinholes. To eight gallons of very fine African opal during the boiling I introduced one-half pound of undried sugar of lead. After the varnish had stood to settle for eight months, I varnished with it a pale patent yellow panel; it floated very well, set and looked well for hours, when it began to dry off in small pinholes completely over the surface, some of the holes as large as the head of a pin. It dried off in seven hours without any tack.

Experiment VI.—That the greater the quantity of driers and acid, the larger the pinholes. I emptied six gallons out of the jar containing the last-named varnish, then I varnished another panel out of the two gallons remaining in the jug; the panels dried in the same time, but went off not only into pinholes, but large blotches all over.

Experiment VII.—That particles either of oil or cold turpentine in the varnish will create pinholes and blemishes. To one gallon of body varnish nine months old, which had been tried and found to be excellent, I introduced one-fourth ounce of water and one-fourth ounce of linseed oil. I heated and mixed all together and poured it into a jar and let it stand for three months, when I varnished two panels, one yellow, the other light green. Four hours after, when I examined them, they were about half dry and beginning to run into pinholes and round empty holes. I examined them with a miscroscope and found a particle of oil hanging to the lower edge or watery circle and the small particles of water had evaporated; the surface appeared as if dotted with the points of so many bristles.

Experimenting with Sanders

Proper sanding is a mighty important item in the furniture factory and proper sanding, rightly construed, consists in doing the work at the lowest practical cost, as well as getting the best possible finish. Were it not so, men might use almost any kind of sander and sanding devices and, by taking time and pains enough, secure exactly the finish desired. Modern methods, however, call for a getting of this desirable finish in the shortest time at the lowest cost possible, and it is this which keeps a man guessing whether he is right or not in his sanding equipment. Perhaps, the best way to keep up with this is by experimenting. There are so many different sanding machines and devices offered that no man can use all of them all of the time. He may experiment with different ones, however, and different combinations of

machines and in this way find out how he can get the best work at the least expense. Of course, experiments of this kind should not be carried on haphazard and just as the notion takes one. The right idea is to make a careful study of all the different kinds of sanders and sanding devices offered and formulate ideas from this study, and then, from time to time, experiment with the ideas and in this way get positive knowledge of what is the best thing in the way of machines and machine combinations to do the particular class of sanding required. It is work that offers good returns for such experiments, because good finish is an essential in furniture stock, and to get a good finish requires time and pains enough that there is always room for some improvement and some saving of cost and some increase in the quality of the work.

Garnet Paper and Cloth in the Chair Factory

The various sanding operations that are necessary in the chair industry are such as to tax the imagination of one who has never been inside a plant of this kind.

The cost of sanding alone is one of the greatest elements in the manufacturing process and a subject which causes the manufacturer much serious thought. Fortunate, indeed, is the manufacturer who has careful operators, and men who are watching for some chance to cut down this item of production cost.

Garnet paper and cloth have been found to give the best results in chair making, whether used on drums, sanding machines, or by hand. No two factories use the same types of machines throughout, but the results that are accomplished are the same, so let us follow the various parts of this most common piece of furniture through the several processes in a modern chairshop.

The Different Sanding Operations

The back, which has been planed on both sides and bent to the required curve, is sanded twice, either on the wide belt of a machine or on the drum. First, it is roughed down on No. 1½ carborundum brand garnet, then passed on to the next operator and smoothed down on No. ½. Paper is used on the drum, while belting machines require cloth.

The back posts, front posts, and other parts of the chair are run through the sander. This sander is known as a three-drum single surfacer, so called because the three drums, usually placed below the bedplate, sand only one surface of the stock that is run through. There is also in use the six-drum double surfacer which has three drums below and three above and sands two sides as the stock goes through.

Covering of the Sanding Drums

These drums are covered with carborundum brand garnet. The first or front one usually has No. 1½, the middle one No. ½, and the last one No. 0, or No. 00, according to finish desired. The coarse paper takes off the rough marks that were left after the material came from planer. The next finer grit removes the sanding marks left from the first, while the finest grit puts on the finishing touches.

In going through the sander the back posts are finished only on the two wide sides, so the narrow edges must be finished on the belt or drum. Sometimes the machine has not given the required smoothness to all places on the flat sides and they have to be touched up on the drum sander. The front posts, stretchers and spindles have to be finished on four sides, and must be put through a machine two or four times, according as to whether a double or a single-surfacing machine is in use. Since the casings show only one side, a single operation through the machine is sufficient. The seat only goes through once, but this is again handled on a machine with a sliding table, in order to finish the sunken or "saddle" shape. Then the round edges of the seat, the back posts, and the narrow edges of the slats are sanded on a belt sander.

How the Finish is Obtained

After these operations are completed the pieces pass through several hands until they are put together and sent to the paint shop. There it is sanded all over with very fine carborundum brand garnet paper and given its first dip in the paint.

If a glossy or cheap finish is desired there is no more sanding; but if there is to be a first-class finish, the chair is allowed to dry, then again sanded with fine paper to take out the lumps. It goes through this operation as many times as it is necessary to get the finish desired.

In the case of a rocking chair the rockers must go through the same operations, and where there are round stretchers, spindles, etc., these must be done by hand, or on other types of machines. Then some chairs have shaped legs which have to be handled on various other types of machines.

Thus when you consider that every piece of a chair must be gone over with three or more grades of garnet paper you will understand why the manufacturer is continually watching for an opportunity to reduce this part of the cost of production.

Furniture Made by Russian Peasants

People in the United States are becoming more and more interested in purchasing kustarny (handmade) goods from Russia, says Consul General John H. Snodgrass of Moscow. The work of the kustari (peasants) shows wonderful development in every section of the Empire. A chief feature is the production of beautiful and useful articles in wood. The furniture branch attracts the most attention.

The P. Pryibil Machine Company, New York City, who have been manufacturing high grade woodworking machinery for the past fifty years, have decided to deal in a complete line of woodworking machinery and tools of every description, carrying in stock or on exhibition high grade machines, new or rebuilt, for prompt delivery. Their exceptionally fine location, being within a few minutes' walk of Times Square, the hub of New York City, and their extensive plant on the premises, put them in ideal position of handling their business to the entire satisfaction of their customers. They report a steadily increasing business both in woodworking machinery and metal spinning lathes. Attention is directed to their page advertisement in this issue.

Constructive Details of a Roll-Top Desk

A Piece of Fine Work the Cabinet Maker or Carpenter May be Occasionally Called Upon to Execute

IT is to be hoped that the descriptive data and drawings here presented relating to the construction of a roll-top writing desk will be of assistance to "A. W. S.," whose request appeared in a recent issue. I think this question can best be answered by describing the construction of a desk from start to finish, for he can alter the design or dimensions to suit his own particular requirements.

Referring to the accompanying sketches, Figs. 1 and 2 show front and end elevations of an average style of desk. It has four drawers in the left pedestal and one drawer and a book cupboard in the right. Both pedestals have also a sliding board or leaf at the top, sometimes called an "arm-rest" and sometimes an extension writing surface. In some cases the cupboard is omitted and drawers are used in both pedestals. The two lower drawers in the right pedestal are often formed into one large drawer, the front of which is made to appear as two drawers, so that both pedestals will have the same outside appearance.

The size of the desk in Figs. 1 and 2 is 48 in. long, 30 in. wide and 48 in. high over all. The writing surface is 30 in. from the floor.

Other sizes for this style desk are 50 in. long by 32 in. wide; 54 in. long by 34 in. wide, and 60 in. long by 34 in. wide, the height remaining the same for all.

The width of the "knee-hole" should not be less than 20 in. and in larger desks may be 24 or 26 in.

In Fig. 3 is shown a different outline for the roll top. It is perhaps a little easier to make than the one with a double curvature and in the opinion of the writer looks better. This style of top is 3 to 4 in. less in height than the other, the writing surface remaining 30 in. from the floor as before.

The desk is preferably made in sections and fixed together with screws so as to permit of its being easily taken apart for moving through doorways, up and down stairs, etc. The sections consist of a top—containing the roll curtain and writing surface—two pedestals and a paneled board which fits in between the pedestals at the back. A cross section of this board and the pedestals, taken just above the bottom rail, is shown in Fig. 4, which also indicates the manner of fixing the corners of the pedestals together.

The sides of the pedestals are framed up as in Fig. 5, which shows one of the outer sides, the minor ones being 7/8 in. less in width to allow the back of the pedestal to project as in Fig. 4. The muntin between the panels in Fig. 5 is shown mortised into the top and bottom rail about 1 inch. In cheap work this muntin merely has a tenon as long as the depth of the plow groove in the rail and is slipped into place the same as the panels. All the mortises shown in Fig. 5 are blind ones; that is, they the cut only part way through as indicated by the dotted lines, and of course the projecting ends of the stiles shown are cut off as soon as the sides are ready to be built into a pedestal. They are left on it in the first place for greater ease in work-

Fig. 6.—Horizontal Section Through Different Panels

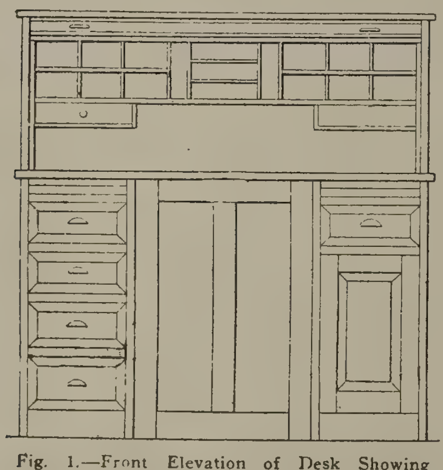


Fig. 1.—Front Elevation of Desk Showing Roll Top Open—Scale 9/16 In. to the Foot

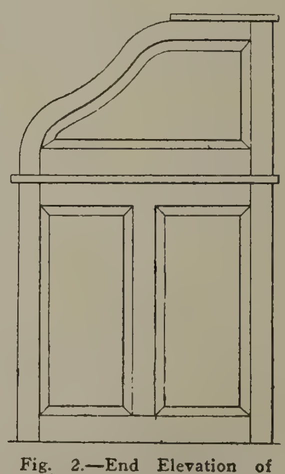


Fig. 2.—End Elevation of Desk—Scale 9/16 In. to the Foot

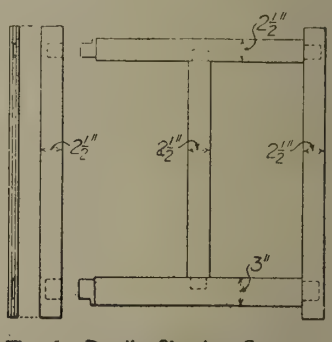


Fig. 5.—Details Showing Construction of Side of Pedestal

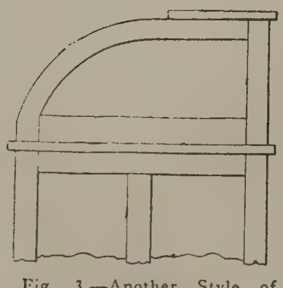


Fig 3.—Another Style of Roll Top

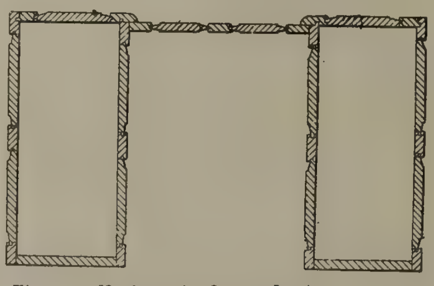


Fig. 4.—Horizontal Cross Section of Desk

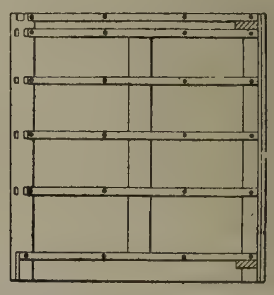


Fig. 7.—Inside of Pedestal Showing Drawer Runners and Other Details

ing the mortises, which being so close to the end are liable to break out during the process of cutting.

The panels of the desk are of the same thickness as the framing and are worked so as to come flush on the inside and show a raised panel on the outside. This, however, entails a lot of work, to avoid which other thicknesses of panels may be used. Material 5/8 in. thick will allow of a raised panel on the ouside as at "A" in Fig. 6 or a flush panel on the inside and a sunken panel on the outside as at "B." Material 3/8 in. thick will allow of a raised panel on the outside as make a panel that is sunken on both sides. The grooves in the stiles are only ¼ in. wide, but ¼-in. material is hardly suitable for panels unless it can be obtained in the form of three-ply veneers.

The style of panel which comes flush on the inside makes a little the best job because it affords a flat surface on which to fix the drawer runners. The latter are of ⅞ x ¾-in. material and are fixed to the sides with screws as in Fig. 7, which shows the small mortises that receive the tenons on the ends of the drawer divisions.

An enlarged detail of one of these division strips is shown in Fig. 9. The top strip lying flat is fitted with the common form which is too well known to need illustrating. It is not, however, usual for desk

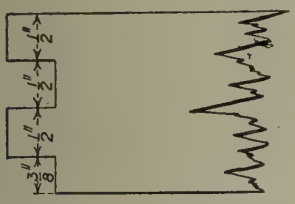


Fig. 8.—Detail of Division Between Drawers—Scale 6 In. to the Foot

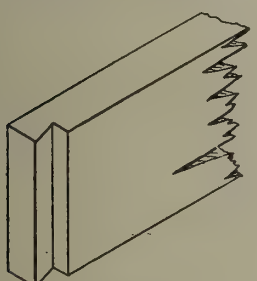


Fig. 9.—The Dovetail Used on the Bottom Rail of the Pedestal

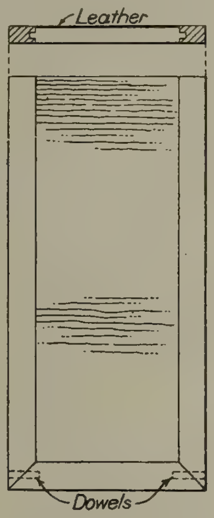


Fig. 11.—Plan and Section of Arm Rest

manufacturers to put in this top piece, the more general way being to omit this strip and allow the "armrest" to come directly under the desk top. When the strips are used they offer an easy method of fastening the pedestals to the top because the screws can be passed straight through the strips from the under side. They also provide a place to "plant" a small molding around under the top, if this be desired.

In the pedestal containing the cupboard the unnecessary drawer slides and divisions are omitted and after the pedestal is put together the book stalls are constructed as in Fig. 10 and slipped into place. They are held in position with screws and a ¼-in. bead or other small molding may be bradded around the front edge to hide the joint. These book stalls are usually made of pine or other soft woods.

The sliding arm-rest should be made as in Fig. 11, which shows it in plan and section. The grain in the centre portion runs cross-ways of the board and in the desk which the writer has in mind this center portion is of soft wood covered with imitation leather. The mitered corners of the ouside rim may be held together with a hardwood dowel, which will answer the purpose just as well if put in after the corner has been glued and cramped together. This outer rim may be mortised and tenoned together, if so desired, in which case the front piece runs right across and carries the mortises, the sides being tenoned into it.

One of the drawers is shown in Fig. 12. The front is ⅞ in., the sides and back ½ in. and the bottom ⅜ in. thick. All the interior woodwork is usually of soft wood, but it makes a better running drawer if hardwood is used for the sides, while the difference in cost is next to nothing. A longitudinal section through a drawer is shown in Fig. 13. The grain of the wood in the bottom should run cross-wise of the drawer in all cases and it should be a tight fit in the groove provided for it. This is best accomplished by making the groove 1/16 in. smaller and beveling the under side of the bottom to fit. The bottom is made fast to the drawer front only and left projecting a little at the

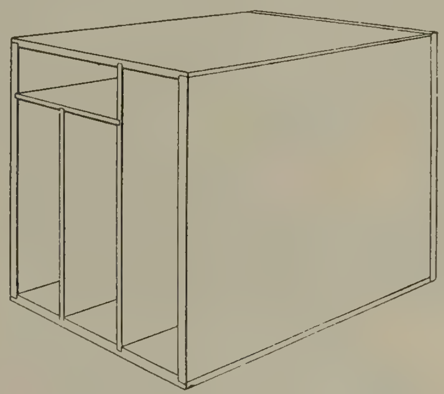


Fig. 10.—Perspective Showing Book Stalls in the Cupboard

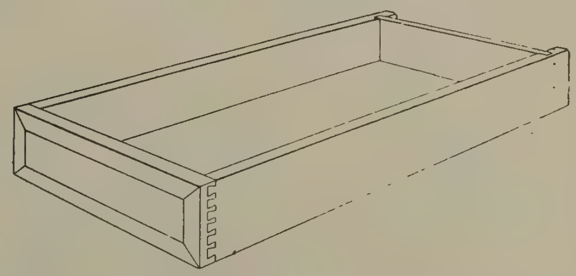


Fig. 12.—Perspective of One of the Drawers

back, thus allowing it to swell or shrink without splitting.

The construction of the drawer is shown quite clearly in Figs. 12 and 13 but if further information is needed and the correspondent has or can obtain a copy of The Building Age for September, 1909— at that time called Carpentry and Building—he will there find the subject treated fully under the heading "The Jobbing Carpenter and Some of His Work."

The arrangement for locking all the drawers automatically is shown in front and side elevations in Figs. 14 and 15. It consists of the piece "A," which is 1¼ to 1½ in. square and fitted to slide easily but not loosely in the pieces marked "B" and "C." These pieces are about 1 x 3 in. in cross section and are fixed across the back of the pedestal at the top and bottom as shown by the section lining in Fig. 17.

A metal catch of the shape shown in Fig. 16 is secured to the back of each drawer and corresponding pins are fixed in the side of the piece "A" of Fig. 14. These pins may be plain pieces of stout iron or wire or

round headed screws as indicated. A coil spring is placed on the foot of the piece "A" of Fig. 14 pressing against "C" and held in place with a pin through "A." The piece "A" is also provided with a stop-pin at the top to prevent the spring raising it too far for the catch, Fig. 16, to engage the pins. The top of the piece "A" projects upward through the desk top, behind the pigeon holes and directly in line with the groove in which the roll curtain travels. When the curtain is down or closed the spring forces "A" upward, causing the pins to engage the catches on the backs of the drawers. When the roll curtain is unlocked and pushed back it rests on the ends of the projecting pieces "A"—one in each pedestal—compressing the springs and disengaging the pins from the catches, and thus allowing the drawers to be opened. The springs can easily be made by taking a short length of steel or hard brass wire and twisting it a few turns around a cylinder of the proper size. The closer the coils are made the stiffer the spring and vice versa. The catches are made with beveled ends so that a drawer may be pushed into place and locked even after the roll-curtain has been closed.

There is another form of lock which has no springs but is only suitable for a desk made all in one piece. In it the hooks are attached to the piece "A" and engage the backs of the drawers. A short lever is attached to "A" with its free end projecting upward in the path of the roll-curtain; when the curtain is pushed back it depresses the free end of the lever and raises the piece "A," thus releasing the drawers.

Still another form of lock—not usually seen on roll-top desks—is one in which the top drawer in the pedestal locks all the others. The piece "A" is arranged exactly as in Figs. 14 and 15 but without the spring, so that the normal position of "A" is at the release with a stop pin resting on the piece "C." All the drawers are fitted with the catch shown in Fig. 16 except the top one and this has a beveled lug projecting from the back which presses against the under side of the top pin, thus raising the piece "A" and locking all the lower drawers. To release the drawers, it is necessary to unlock the top one and draw it out a short distance.

This completes our discussion of the lower portion of the desk with the exception of the paneled board which fits in between the pedestals. As this is exactly the same as the sides of the pedestals excepting in width there is little to say regarding it unless we mention that "through" mortises may be used instead of blind ones, if they are found easier to make. Often a shallow drawer is made and fitted directly under the desk top in between the pedestals and that sometimes when the drawer is omitted a narrow strip with bracket shaped ends is fitted in its stead.

A cross section of the top of the desk is shown in Fig. 17. It will be best to draw the outline of this full size on a sheet of paper, sketching in the curves freehand. After the correspondent has them to suit, the paper can be laid on top of the material to be marked and the lines transferred either by means of carbon paper or by going over the outline with a dressmaker's tracing wheel, which will reproduce the lines on the material in a series of dots. The curved front rail can be cut in one piece from a board 10 inches wide. It is joined to the stile at the back by mortise and tenon and to the rail at the bottom with two hardwood dowels, the latter form of joint being the best at this place on account of "the way of the grain."

The curved groove in which the roll-curtain works is gauged from the front edge to show an equal margin. It will have to be carefully cut with chisel and router and is best cut after the side has been framed and glued together. The groove which receives the edge of the panel is cut with a chisel of the correct width in the same manner that one would cut a mortise. If one can get the use of a foot power mortising machine the groove can be cut quite easily.

The desk top, which to avoid confusion I have called the "writing surface," can either be glued up solid, or it may consist of an outside rim of hardwood properly framed and fixed together and having a soft wood center covered with imitation leather, as described for the slides in the pedestals.

The leather may be fastened in place with liquid glue, as ordinary glue sets too fast to allow of its being used for this purpose. Paperhanger's paste such as is used for hanging burlap is also good, but to the wood-worker the liquid glue offers the least bother.

Veneering might be suggested for a desk top instead of solid wood, but veneering requires special knowledge and appliances and for a single job the extra work required for veneering would more than offset the difference in price between a veneered top and one built solid.

The roll-curtain is composed of strips ¾ in. or less in thickness by ⅞ in. in width. The bottom strip is ⅞ x 2 in. to provide room for the lock and hand holes. It must be reduced at the ends sufficiently to permit of its traveling in the groove and all the strips must be rounded at their edges as in Fig. 18 for the same reason. The strips are all held together on a

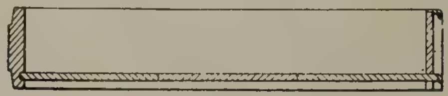


Fig. 13.—Horizontal Vertical Section Through One of the Drawers—Scale 9/16 In to the Foot

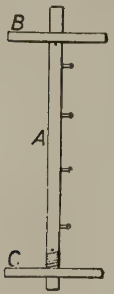


Fig 14.—Front View of Automatic Drawer Lock

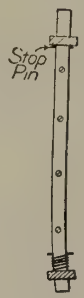


Fig. 15.—Side View of Automatic Drawer Lock

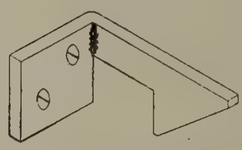


Fig. 16.—Perspective of Metal Catch for Back of Drawer Shown One-Half Full Size

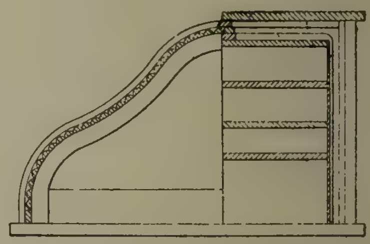


Fig. 17.—Vertical Cross Section of Upper Part of Desk

Fig. 18.—Partial Cross Section of Roll Curtain—Scale ½ Full Size

piece of stout canvas which is fastened to the back of them with glue and small tacks. The curtain requires no weights or other attachments—its own weight being sufficient to carry it in either direction after it has been moved past the center. It will perhaps be found to work stiff and jerky after the desk has been varnished, but if it does, rub the groove well with a cake of beeswax. The pigeon holes are made of pine, using ½ in. for top and sides, ⅜ in. for shelves and back and ¼ in. for divisions. They are made separate from the desk and fixed in place like the book stalls in the cupboard.

The back of the top is formed of a paneled frame which is fitted to the ends in the same manner as the backs of the pedestals. The top board is fixed to the back and sides with screws that are run in at an angle from the under side. Small soft wood blocks are also fitted and glued in the angles formed by these various pieces. These blocks are an important factor in holding the various pieces rigid and square and should be used wherever they can be placed without being seen, both in the pedestals and upper portion.

After the roll-curtain is in its groove the writing surface can be fixed to the back and sides with screws. It need only be fixed temporarily until the pedestals and top have been assembled and the working of the various parts proved correct.

The foregoing covers most of the points likely to crop up and the writer will close the subject with a few general remarks upon the way he would handle a job of this kind. The first work after a careful examination of the drawings would be to make "setting-out rods" for the various parts. The next would be to make a careful and correct bill of material showing the size of every piece. Then with the material at hand commence cutting it up, starting with the largest and most important pieces and working on down to the smallest and most insignificant, which will usually take care of themselves. The writer is supposing the desk to be made by hand and would in most cases prefer to get the material for his framework in the rough. This is in direct opposition to the advice given in most articles of this kind, but there is a reason for it.

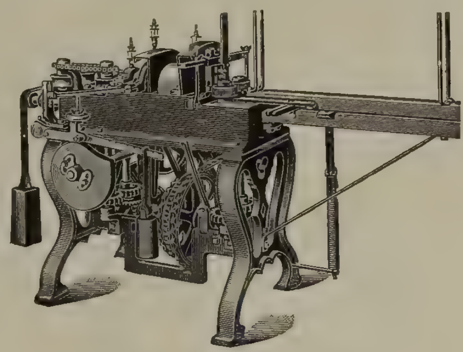
It is absolutely impossible to have the framing flat and level and without twist unless every piece of which the framing is composed has been taken "out of wind" before it is plowed, mortised or tenoned, as the case may be. Machine dressed lumber has just as much twist in it as rough lumber and must be straightened in the same way, the difference being that rough lumber is approximately 1 in. thick, while machined lumber does not usually run more than 13/16 in. and if there is much twist in it will have to be dressed down until too thin for use.

Do all of the dressing at one time and as far as possible follow along that line with all the other operations required. All the mortising, tenoning, plowing, etc., should be done at the one time and in its proper order. Do not fix any of the parts permanently together until you are positive all the required work has been done on them. Most of us are anxious to see how the thing is going to look, and after we have it together we sometimes find that there is a mortise to be cut in some inaccessible part or something of a like nature.

All of the various phases of work contained in this job, such as jointing, gluing, taking out of wind, mortising, dovetailing, etc., etc., have been fully described in some portion of the serial article entitled "The Jobbing Carpenter and Some of His Work," which appeared in back volumes of this paper. Such matters as fitting locks, making "settingout rods" and bills of material were also covered in that series. If the correspondent in question has access to the issues containing these articles a perusal of them may be of assistance.

A Lathe That Does the Work

We illustrate on this page the Ober automatic lathe for turning fork, hoe, rake, mop, broom and ice hook handles, pike poles, trolley poles, tent poles and other work of this class. The lathe is entirely automatic, the operator having only to pile the squares between the guides in front and the machine feeds itself. A front feed roll is opened and closed automatically so that when one stick leaves the rolls the next drops into its place and is fed through the machine. The first knife simply rounds the work to the size of the die and the finishing one, being automatically moved to or from the centre of the die by the cam pattern, makes the shape of the handle. By turning a screw on the arm which is raised and lowered by the cam pattern, the work done by the finishing knife can be made larger or smaller as is required.



The No. 10 Ober Lathe.

The cam pattern is made of wood and any pattern can be made and put onto the lathe in a very short time at a trifling expense. Another good point is that the taper or knob of any article can be made longer or shorter without altering the cam pattern.

The lathe is provided with a lever and clutch for starting or stopping the feed and will turn from 500 to 700 broom handles per hour, and other work accordingly. Up to 1 11/16 inches in diameter can be turned by the regular sized lathe which is furnished with four dies of any size desired and with gearing to turn from 2 to 18 feet long. Extra dies and gearing for turning longer work can be furnished at an additional cost and special lathes are made for turning 2 in., 2¼ in. and 2⅜ in. in diameter.

The lathe, which is very simple, strong and durable and easily changed from one kind of work to another, can be operated by a 3 h.p. motor. With each lathe a countershaft is furnished, the tight and loose pulleys of which are 10 inches in diameter for a 5-inch belt and should turn 1050 revolutions per minute. This excellent lathe is the product of the Ober Manufacturing Company, of Chagrin Falls, Ohio, whose advertisement appears elsewhere in this issue.

Always bend nails down or remove them before throwing boards aside. Many serious injuries result in stepping on protruding nails.

There is perhaps many a man who has wished many times this spring that he had loaded up heavily on lumber last year.

Carpentry and House-Building

A permanent department devoted to practical problems of construction and planning. Readers of the Canadian Woodworker are invited to contribute to this department and to submit details of work involving special difficulties.

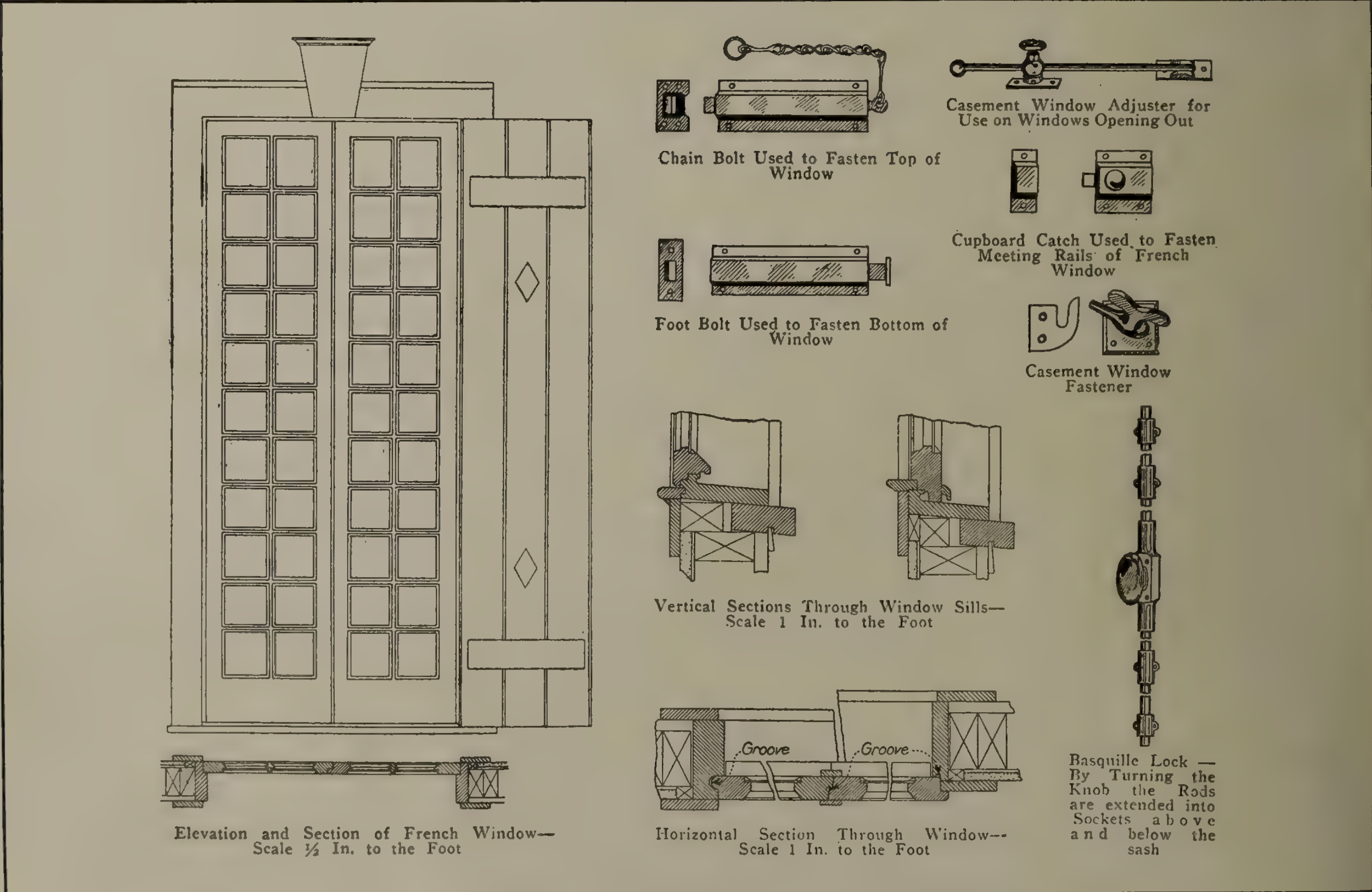
The Making and Use of Casement and French Windows

By Charles Everett Anderson

CASEMENT windows are extensively used in building construction in Europe but they are not so common in this country, although if properly made they are useful in certain places as well as ornamental. Casement sash can be used on low windows where checkrail sash could be opened only a few inches. In a dormer where the window may be only 2 or 3 ft. in height casement sash can be opened the full size of the window, whereas checkrail sash would give only half of the open space.

One of the objections which has been raised in some sections with respect to casement windows is the difficulty encountered in making them storm-proof, especially if they open inward. The only way to overcome this defect is to make sure that the wood used has shrunk to its limit before constructing the window. Casement windows are usually tight when made, but after a short time has elapsed the shrinking of the wood tends to open up the meeting rails and leaves openings at the top and bottom of the window, admitting drafts of air and the rain if there be a driving storm. The wood used in mill work is not always sufficiently dry to prevent these defects and special drying would seem to be the only thing to suggest as a remedy for leaky casements.

The drawings presented herewith relate to details of two methods of fitting sash which swing inward, also details for the lower rail, both for a window swinging inward and one swinging outward. The French window shown has an opening 3 ft. by 7 ft. which is a stock door size, and requires merely a stock door frame. The windows can be made any size, although 3 ft. is a good width, while the height depends upon the location. Those for which the details here presented were drawn are 3 ft. high, with an opening 3 ft. wide. The bottom rail of the casement opening inward and having a projecting lip should be 2¾ in. deep by about 2½ in. thick. The bottom rail on



Elevation and Section of French Window—Scale ½ In. to the Foot

Chain Bolt Used to Fasten Top of Window

Casement Window Adjuster for Use on Windows Opening Out

Cupboard Catch Used to Fasten Meeting Rails of French Window

Foot Bolt Used to Fasten Bottom of Window

Casement Window Fastener

Vertical Sections Through Window Sills—Scale 1 In. to the Foot

Horizontal Section Through Window—Scale 1 In. to the Foot

Basquille Lock — By Turning the Knob the Rods are extended into Sockets above and below the sash

the casements opening outward should be 3¾ in. deep by 1⅜ in. thick. The top rails, meeting rails and hanging stiles of the casement should be 2¾ in. wide by 1⅜ in. thick. French windows are made a little heavier, the material used being 1¾ in. thick. Since they are not tongued into or lapped over the jambs the rails and stiles need not be so wide. The hanging stiles and meeting rails may be 2¼ in. wide, the top rail 2¾ in. and the bottom rail 8¼ in. wide to prevent sagging.

Capillary action or the tendency of water to work itself between two closely adjacent surfaces should be guarded against by grooves as indicated in the various sections. These grooves are also useful in preventing the water beating in under wind pressure, since the wind coming through a small crack between the sash and the jamb and then into the larger space caused by the grooves, loses some of its force, just as the current of a river slackens at a point where the banks are wider apart. A throat or groove should be provided especially in the lower rail. The sill should be well pitched and rabbeted for the sash. The stiles are sometimes tongued into the jambs, as shown in one of the details, a groove being left between the tongue and jamb. Where the windows open inward the lower rail should project well outside of the jamb and should be grooved to prevent the water from running under.

Where the window is to open outward the problem is somewhat similar, the rail and sill being grooved and throated and a grooved molding being placed on the outside of the sash with the groove underneath to keep the drip away from the bottom of the sash. The meeting rails should be beveled and rabbeted, a groove being placed at the centre of one meeting rail to permit any water to run off which might work its way in.

If casements are made with a single sash instead of with two, they should be made to swing inward since it is almost impossible to get at the outside of a single casement to wash it if it be located at the second storey. Double casement sash are not open to this objection.

French windows, so-called, which are really doors, are usually in a more or less protected location, generally opening on a porch protected by the porch roof. In such a case it is not necessary to take any more precautions than with an ordinary door and the jambs are usually detailed in the same manner as ordinary door frames. If they are to be placed in a more exposed position they should be detailed in the same manner as the casement windows.

French windows and casement windows if properly designed and used add remarkably to the appearance of a cottage. It is customary to detail them with small lights, and in fact their appearance is greatly improved by keeping the lights small. The French window shown in the drawing has lights approximately six inches square. The appearance is improved if the panes are slightly higher than they are wide. In the case of a cottage, for instance, the French windows on the lower floor open into the living room and give more light than would the ordinary window, as well as adding an air of distinction to the cottage. The upstairs casements are three feet high and can be opened so as to give the full benefit of the entire window space, whereas checkrail windows could be opened only eighteen inches.

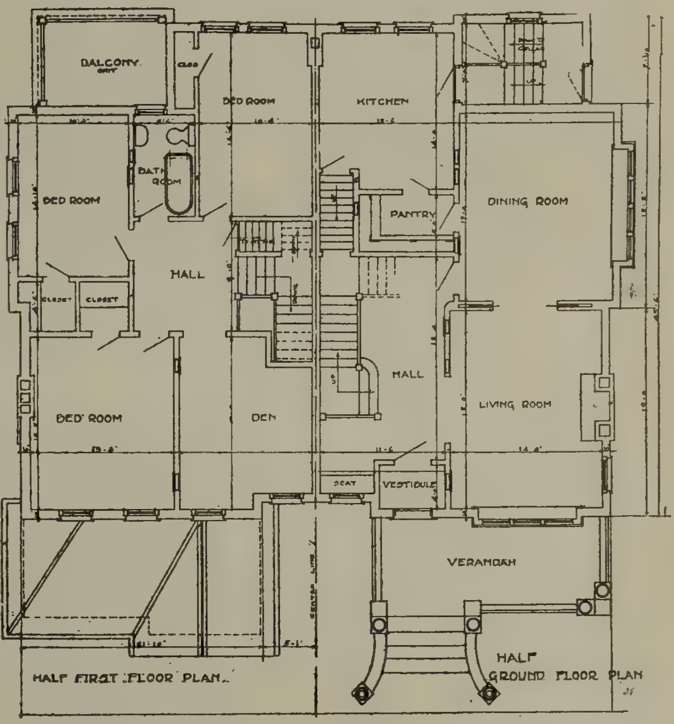
These windows can be fitted with fixtures which will permit of their being fastened open any distance if they open outward. They are usually fitted with foot bolts and cupboard locks, and are fastened at the top with a spring bolt to which a chain is attached, by pulling which the bolt can be unfastened. Sometimes a basquille lock is used. This consists of a knob or turn-screw at the center of the meeting rails with a bar running to the top and bottom of the sash. When the knob is turned the rods push upward and downward into eyelets in the casing, fastening the window.

In the accompanying illustrations are shown some of the hardware used in connection with casement windows.

Duplex Apartments at St. Catharines, Ont.

By W. J. Dunn

THIS apartment is 53 ft. 10 in. x 45 ft. 6 in. in size, making each apartment 26 ft. 11 in. x 45 ft. 6 in. There is a solid brick firewall from below cellar floor line to roof lines. The foundations are solid concrete to grade line, then coursed lime stone to joist line on the first floor. The exterior is of red pressed brick laid in white mortar with ¾-in. raked joints and trimmed with cement caps, sills, etc. The roof is shingled with best cedar shingles stained dark green. Gables are pebble-dash plastered and finished in English half-timbered style. The cornices are finished with brackets.



Duplex Apartments, St. Catharines, Ont.

A Book for the Carpenter

"Carpentry" is the title of a book written by Mr. Gilbert Townsend, with Ross & Macfarlane, Montreal, and published by the American School of Correspondence, Chicago, Ill. This book will prove very useful to the present-day carpenter. It was with the idea of satisfying a real demand for a practical work on carpentry and joinery which should cover in every detail the many problems which the present-day workman and contractor must meet and solve, that this volume has been published. It is specially adapted for

purposes of self instruction and home study and the utmost care is being used to make the treatment appeal to the technically trained expert as well as to the beginner and the self-taught practical man.

After a short introduction, timber in its natural state and the classes of trees are discussed, giving the reader an insight into the manner of growth, details of wood structure, such as grain and fibre, decays in wood such as heartshake, windshake, starshake, dry rot, etc.

Next follows the conversion of timber into lumber, explaining the various methods of cutting logs. The different varieties of timber are then dealt with, furnishing the reader with concise information respecting practically every tree that is used in carpentry and joinery. Then follows a chapter on carpenters' tools, which may be read with interest and profit by even the most experienced carpenter. The chapter concludes with a reference ,to laying out and staking out.

Part 2 is devoted to framing, joints, splicing, etc., and these important subjects are dealt with thoroughly.

Part 3 is devoted to the roof, describing the many different styles and the methods of layout and building of same.

Part 4 is devoted to interior and exterior finish, every branch of this important department being thoroughly dealt with. The book is profusely illustrated and comprises 258 pages with index.

Methods to be Observed in Laying Out a House*

In undertaking the construction of any building, the first thing to do is to make a thoughtful examination of the piece of ground upon which the structure is to be placed. This is very important as the character of the soil upon which a dwelling is located will very largely determine its sanitary condition, and will influence to a great extent the health of the occupants. Very often a difference of a few yards in the location of a building will be enough to cause the difference between a perfectly dry cellar and one which is constantly flooded with water. Water is, indeed, the one thing above all others which must be guarded against, since it is impossible to keep it out of a cellar which is sunk in damp ground, unless some elaborate system of waterproofing is employed.

Ground Water

Below the surface of the earth there is always to be found what is known as "ground water." This stands practically always at a level, and is not met with so near the surface on a slight knoll or other elevation as in a depression. If possible, a house should be located on comparatively high land, so that the floor of the cellar does not come below the ground-water level. Below the surface of a hill, however, there may be a stratum of rock which will hold the rain water and prevent it from sinking at once to a ground-water level. Such a ledge or rock causes the water to collect and then flow off in small subterranean streams, which will penetrate the walls of a cellar if they happen to be in their path.

A good way to discover the depth of the ground-water level or the existence of rock ledges beneath the surface of the ground, is to dig a number of small, deep holes at various points of the site. These should be carried below the proposed level of the cellar bottom. A suitable location for the building may thus be chosen.

If, however, it is not easy to make so thorough an examination of the site as this would allow, another method may be employed. This consists in the use of an instrument called an "auger," which is very much like an ordinary carpenter's auger or bit, though much larger. The auger generally used is about 2 inches in diameter. It is driven into the ground, and as it descends into the hole which it bores it brings to the surface small portions of all the different kinds of material through which it passes. This material may be preserved and examined at leisure. The character of the site may be determined in this way.

Staking Out

When the approximate position of the structure has been decided upon, the next step is to "stake it out," that is, the position of the corners of the building must be located and marked in some way, so that when the excavation is begun the workmen may know what are the exact boundaries of the cellar. This "staking out" should always be carefully attended to, no matter how small the building may be. In works

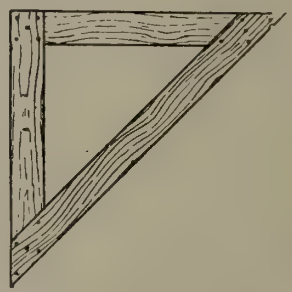


Figure 1. Mason's Square.

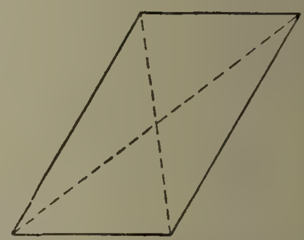


Figure 2. Diagram Showing Wrong Layout.

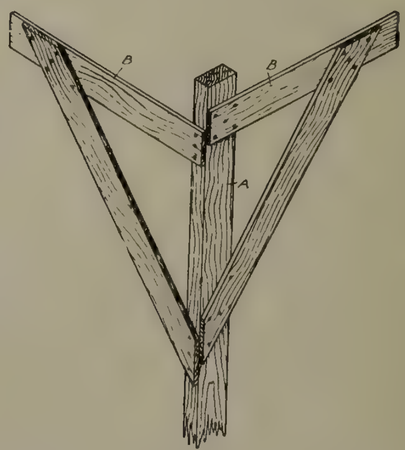


Figure 3. Batter Board to Indicate Layout.

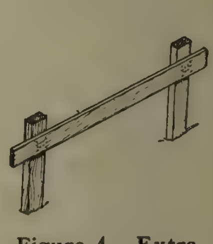


Figure 4. Extra Strong Type of Batter Board.

* From "Carpentry," by Gilbert Townsend, S.B., published by the American School of Correspondence. Reprinted by permission.

of importance it is best to have the work done by an engineer, but on small work it is customary for the contractor or the architect to attend to it. It is well to have at hand some instrument with which angles can be accurately measured, such as a transit; but the work can be done very satisfactorily with a tape measure and a "mason's square." This simple instrument is composed of three sticks of timber nailed together as shown in Fig. 1, to form a right-angled triangle. It is important that the tape used should be accurate, a steel tape being always preferable, and that the mason's square should give an exact right angle. A mistake in the staking out may cause endless trouble when the erection of the building itself is begun, and it is then too late to remedy it.

There are several different lines which must be located at some time during the construction, and they may as well be settled at the start. These are: the line of excavation, which is outside of all; the face of the basement wall, inside of the excavation line; and in the case of masonry building, the ashlar line, which indicates the outside of the brick or stone walls. In the case of a wood structure only the two outside lines need be located, and often only the line of the excavation is determined at the outset.

The first thing to do is to lay out upon the ground the main rectangle of the building, after which the secondary rectangles, which indicate the position of ells, bay windows, etc., may be located. Starting at any point on the lot where it is desired to place one corner of the building, a stake should be driven into the ground and lines laid out parallel and perpendicular to the street upon which the structure is to face. At the ends of these lines, which form sides of our rectangle, the lengths of which are determined by the dimensions of the building, other stakes should be driven, which define the direction and the length of the building. The exact location of the ends of the line may be indicated by a nail driven into the top of each stake.

After these lines have been thus laid out, others may be laid out perpendicular to them at the ends, with the aid of the mason's square and the tape measure. The accuracy of the right angle may be checked by the use of the "three-four-five" rule. This rule is based upon the fact that a triangle, whose three sides are, respectively, 3, 4 and 5 feet long, is an exact right-angled triangle, the right angle being always the angle between the 3-foot and the 4-foot sides. This fact may be proven by applying the well-known theorem, which states that the length of the hypotenuse of a right-angled triangle is equal to the square root of the sum of the squares of the other two sides. The rule may be used as follows:

Lay off on one of the side lines already laid out on the ground any multiple of 3 feet, as 9 feet or 12 feet. On the other line, presumably at right angles to the first one, lay off the same multiple of 4 feet, as 12 feet or 16 feet. Now a straight line measured between the points so obtained, should have a length equal to the same multiple of 5 feet, as 15 feet or 20 feet. If this is not found to be the case the angle laid out is not an exact right angle, and instead of a rectangle we have a parallelogram as shown in Fig. 2. This will not do at all, and the inaccuracy must be corrected. It is possible to lay out the right angle in the first place by this same method, using two flexible cords, respectively, 4 feet and 5 feet long. The end of the 4-foot cord should be fastened at the end of the side line of the building, and the end of the 5-foot cord should be fastened on this same side line, 3 feet away from the corner. When the loose ends of both cords are held together, and the cords are both drawn taut, the point where the ends meet will be a point on the side line of the building perpendicular to the first side line. It is evident that this point must be just 4 feet from the corner, and that the distance between it and the point on the other side line, 3 feet from the corner, must be 5 feet.

After all the corners of the building have been located, their position should be indicated by the use of "batter boards." One of these is shown in Fig. 3. It will be seen that it consists of a post A, which is set up at the corner, together with two horizontal pieces BB, which extend outward for a short distance along the sides of the rectangle that has been laid out. The horizontal pieces may be braced securely as shown, and the whole will be a permanent indication of the position of the corner. Notches may be cut in the top of the horizontal pieces to indicate the position of the various lines, and cords may then be stretched between the notches from batter board to batter board.

Another way to indicate the position of the lines is by driving small nails into the tops of the batter boards instead of cutting notches in them; but nails may be withdrawn, while the notches when they are once out, can not easily be obliterated.

Batter boards should always be set up very securely, so that they will not be displaced during the building operations. If there is danger that the form of batter board shown in Fig. 3 may be displaced, because of the large size of the structure and the length of time during which they must be used, the form shown in Fig. 4 may be substituted. Two of these at right angles to each other may be placed at each corner.

Business Decalogue

Thou shalt not wait for something to turn up, but thou shalt pull off thy coat and go to work, that thou mayest prosper in thy affairs.

Thou shalt not be content to go about thy business looking like a loafer, for thou shouldst know that thy personal appearance is better than a letter of recommendation.

Thou shalt not try to make excuses, nor shalt thou say to those who chide thee, "I didn't think."

Thou shalt not wait to be told what thou shalt do, nor in what manner thou shalt do it, for thus may thy days be long in the job which fortune hath given thee.

Thou shalt not fail to maintain thine own integrity, nor shalt thou be guilty of anything that will lessen the good respect for thyself.

Thou shalt not covet the other fellow's job, nor his salary, nor the position that he hath gained by his own hard labor.

Thou shalt not fail to live within thy income, nor shalt thou contract any debt when thou canst not see the way clear to pay it.

Thou shalt not be afraid to blow thine own horn, for he who so faileth to blow his own horn at the proper occasion findeth nobody standing ready to blow it for him.

Thou shalt not hesitate to say "No" when thou meanest "No," nor shalt thou fail to remember that there are times when it is unsafe to bind thyself to hasty judgment.

Thou shalt give every man a square deal. This is the last great commandment, and there is no other like unto it. Upon this commandment hang all the law and profits of the business world.

New Dry Kiln Instruments

The Morton Dry Kiln Company, 20 West Jackson Blvd., Chicago, Ill., have recently perfected and put on the market their new instruments for use in connection with dry kilns. These instruments, which are here described, are of interest to the woodworking trade.

Fig. 1 shows an illustration of a Troemroid Scalometer which is made to determine when the lumber is sufficiently dry. This instrument has a 2 oz. beam with 64 divisions on its upper edge, and on the lower edge it is divided into 100 divisions.

A specially designed percentage chart is mounted in a sliding frame that is attached to the base of the scalometer. Indicator pointers are attached to the frame, and by means of these and the chart, the percentage of moisture in the test pieces is determined definitely without any calculations.

It is customary to test lumber by removing a board from the side of the kiln car and cut from its middle crosswise the board pieces to be tested; weigh the pieces using the divisions on the lower edge of the beam. Look at the top of the chart and find the corresponding number and place the pointer on the horizontal bar opposite this number.

Now put the test pieces on a hot cylinder or radiator for one or two hours and then immediately weigh them. Look at the left side of the chart and find the number corresponding to this weight, raise the chart until this number occurs directly opposite the pointer on the post.

The percentage of loss will be found under the pointer on the horizontal bar.

Example: Assuming the first weight to be 90 and the second weight after the test pieces are dried as described above to be 85, if the percentage chart is operated as described above, the chart will show the loss of moisture to be 5.6 per cent. and therefore the lumber is dry enough to be removed.

Lumber should be dried to show not more than 6 per cent. of moisture.

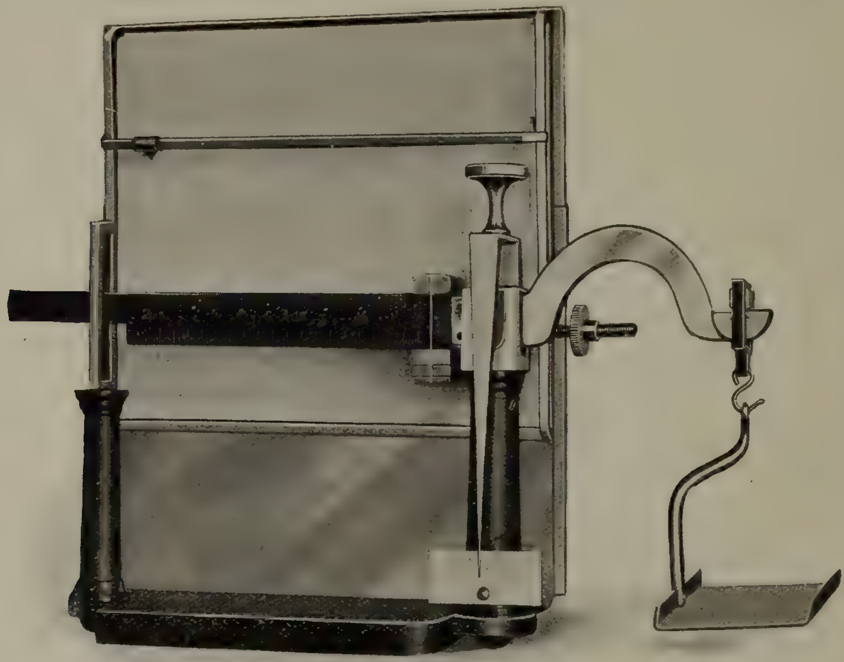


Fig. 1. Troemroid Scalometer.

With the use of this instrument it is no longer necessary to guess at the conditions of the lumber. It can be used to determine how much moisture is in the lumber before it goes into the kiln, and it determines with absolute precision just when it is dry enough, and it eliminates all chance of transferring the lumber from the kiln to the factory before it is properly dried, and it also shows if the lumber is over dried.

The Morton Registering Hygrometer, shown by Fig. 2, consists of two specially constructed thermometer tubes similar to a physician's fever thermometer and mounted in a coppered case. The bulb of one tube is cooled by means of a silk wick extending into a glass vessel of water. When the hygrometer is placed in the kiln through a small openopening in the large door and left 25 minutes it will automatically register the wet and dry bulb temperature. It may then be carefully removed and the recorded temperature of both thermometers noted.

The outside temperature will not affect the temperature of the hygrometer. By means of the copyrighted chart shown by Fig. 3, the humidity of the drying room can be determined.

Example: Assuming the temperature of the wet bulb to be 130 degrees and the dry bulb 140 degrees, a vertical line extending down from the intersecting line will show a humidity of 74 per cent. Take a reading early in the morning at each end of the kiln, and do not take one at or near the time of putting in or removing a car of lumber. Do not leave the hygrometer in the kiln but put it in a safe place after using.

Fig. 4 shows a Bristol Morton Recording Thermometer. This instrument is especially designed for use in lumber driers. It is made with a 25-ft. capillary tube extension

Fig. 2. Morton Registering Hygrometer.

which permits of placing the thermometer on the outside of the kiln, running the connecting tube through the wall and up to the ceiling. These instruments are furnished with a 7-day clock movement and with weekly charts ranging from 100 to 200 degrees.

This thermometer records the temperature for every hour of the day and night upon the charts and the only attention it requires is to wind the clock and change the charts once a week. It tells you every morning if an even temperature and consequent steam pressure has been maintained throughout the night in the dry kiln and in the boiler.

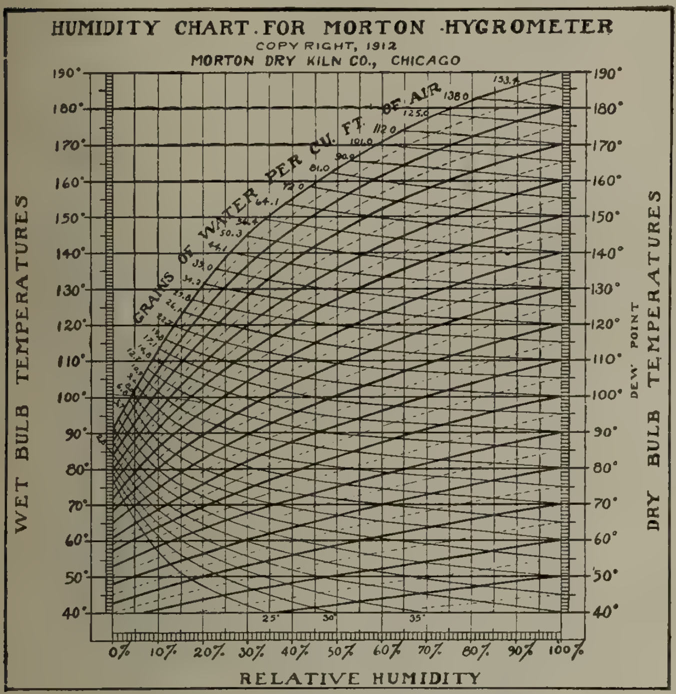


Fig. 3. Morton Humidity Chart.

The instrument is of the highest type of construction throughout and absolutely accurate. The case is neatly japaned, the door is nickle-plated as well as the trimmings.

Fig. 4. Morton Bristol Recording Thermometer.

Each thermometer is furnished complete with 100 weekly charts, padlock, key, bottle of special red ink and dropper, and 25 feet of copper capillary tubing and bulb.

The Morton Dry Kiln Company advise that these instruments have all been thoroughly tested out before being placed on the market and a great number of them are already in use. They also state that to anybody purchasing these instruments that they furnish free complete card of instructions covering the use of the instruments, as well as proper temperatures and humidity to carry for the different kinds of lumber, with complete instructions in reference to piling, and other information as to the operation of lumber driers to secure the best results.

Greenheart Wood will Outlast Iron and Steel

A wood which, according to the Department of Agriculture, outlasts iron and steel when placed in water is British Guiana greenheart. It is used in ship and dock building, trestles, bridges, shipping platforms, flooring and for all purposes involving great wear and tear. The woods of two species of West African trees have been introduced into English markets as substitutes for greenheart under the name of African greenheart, but both are inferior to the South American tree.

All the gates, piers and jetties of the Liverpool docks and practically all the lock gates of the Bridgewater canal are of greenheart. It furnished the material also for the fifty pairs of lock gates in the Manchester (Eng.) ship canal. When the greenheart dock gates in the Mersey harbor at Liverpool were removed in order that the channel might be deepened and widened the same wood was again employed in building the enlarged gates, and wood placed in the gates of the Canada dock in 1856 was used again in its reconstruction in 1894. The use of greenheart has been specified for sills and fenders in the lock gates of the Panama canal. Nansen's ship the Fram, and the Antarctic ship Discovery were built of greenheart. In addition to its use as timber, great quantities of the wood are made into charcoal.

Though it grows in parts of British, French and Dutch Guiana, Venezuela, Brazil, Colombia, Peru, Trinidad, Jamaica and Santo Domingo, it is being cut only in British Guiana, where it is found along the seacoast and water courses, seldom extending more than fifty miles inland. Greenheart used to bring $1 per cubic foot at the point of shipment, but the present price is considerably less. Constant drain for more than 100 years upon the most accessible stands of greenheart in British Guiana has stripped the forest of its best material, and the wood now obtained is of inferior quality. Tracts are now being cut over in some places for the third time. Only the heartwood of the tree possesses the peculiar durability desired, and the best wood is found in old trees.

Simonds Canada Saw Company, Limited

Carl A. Pennington, Vancouver manager for the Simonds Canada Saw Company, Limited, for several years, resigned that position last month, owing to the continued ill-health of Mrs. Pennington, and will in future make his home in California. The vacancy has been filled by the transfer from Montreal of R. E. Greenwood. F. B. Lewis, cashier in the Vancouver office for the past year, has also left the company to engage in business in Seattle. He is succeeded by R. R. Young, late of the Seattle office. A new appointment brought about by the increasing business is that of city salesman, which position is now held by Ralph H. Glover. E. V. Sackett, the company's travelling representative, has had his territory enlarged and now covers a number of Mountain mills, as well as the Coast and part of Washington. The Vancouver office has been doubled in size to meet the requirements of the growing volume of business. This has also necessitated the enlargement of the stock room and an addition to the staff of mechanics in the shop overhead, which has been remodelled and fitted with new grinding machinery, etc.

The Economy and Suitability of Hardwood Doors

It is a fact generally recognized by the public at large that one of the surest measures of the suitability of any article or commodity for the purpose intended is the extent of its popularity. Take hardwood doors for example. The fact that they are now insisted upon as a matter of course in the cities and towns where they have been introduced, and that architects, owners and builders alike unite in recommending them to their friends who are about to build, is certain proof that they are highly satisfactory and are considered a good investment. The hardwood veneered door is probably making more progress today than any other one article in the building line manufactured from wood.

The explanation of this remarkable progress is to be found in the fact that the builders of modest homes have taken to hardwood doors. They cost only a little more than the solid pine doors. When a prospective home builder goes into some newly finished home and sees hardwood doors, the pine doors are no longer attractive and he wants hardwood doors immediately.

Aim of Every Home Builder

The aim of every home builder is to have the interior of his home rich, beautiful and harmonious at a small expense. These desirable requirements are determined by the kind of furniture and woodwork in the various rooms. Doors are the most conspicuous furniture in a room. If they are common, old-style, and poorly finished, no matter how beautiful and valuable the rest of the furniture may be, the room will lack harmony and have a cheap appearance.

The quality of the entrance and doorways of a home reflect the personal taste of the owner. When you choose doors substantially made by high-grade cabinet workers, designed correctly and adapted to the general style of architecture of your building, you create an effect which makes a favorable impression, strong, pleasing and lasting. The door looks well: "it is a source of beauty forever;" the door hangs true so that the opening and shutting of it is a real pleasure; the door shows no signs of wear or weather; it is solid and honest—an artistic and useful door which does credit to its surroundings and gives a tone of refinement by its satiny, rich finish.

Thus it comes about that the economy of modern hardwood doors arises first from the satisfaction and pleasure they produce which brings them into great demand by renters and buyers. As one speculative builder expressed it, "Yes, we use nothing but hardwood doors. If they were twice as expensive as they are we would still consider them a good investment; for the buyers will have 'em."

Cost of Hardwood Doors

The nice part about it is, too, that they are not—compared with ordinary cheap doors—expensive. The leading hardwood door manufacturers have developed the business on such an immense scale that they are able to turn out this high-grade hardwood product at practically the same cost as the poorer soft woods.

An example of the progressive, wide-awake business policy of these hardwood door manufacturers, which policy is now bringing their products within the reach of all, was recently in evidence. It appeared that the enormous demand for a certain well-know brand of veneered doors in large cities was not being duplicated in the country and small towns on account of the lack of confidence in the painters to properly stain and finish the hardwood doors and trim. This manufacturer accordingly announced to the trade that he would establish a complete finishing department. and give to the rural and small city buyer an opportunity to secure his doors and all kinds of interior trim, stained and shellacked, ready for varnish.

Millwork stained and shellacked ready for varnish can be handled in exactly the same manner as in the white, and requires no more labor or expense at the building. This manufacturer considered it a privilege and pleasure to extend, in this manner, to the small city and rural home builder an opportunity to beautify his residence or cottage on a par with the artistic interiors of city dwellings at a cost easily within the reach of all.

The Standard Hardwood Door

The hardwood door of today is usually a veneered door. Now and then may be found a solid door, but these are exceptions and are made to order to satisfy a sentimental rather than a structural requirement. There are doors with thin hardwood veneer, some with thick hardwood veneer, doors with plain hardwood veneer and doors with extremely fancy veneer very carefully matched and artistically finished.

The standard door is veneered one-eighth of an inch thick. In the fancy door, taking mahogany and other figured woods, thin veneer is used, because it is not practical to get it in the standard thickness of the door stock. Also, there is a disposition now in building doors for outside, to use a heavy veneer. Some of it is made as thick as one-fourth of an inch on the theory that it will resist the moisture better and there will not be any likelihood of veneer peeling off, a thing which sometimes happens when thin veneer is used and the door is exposed to the weather on the outside.

In the veneer door manufacturing world proper, birch is the first wood that became conspicuous in the making of the hardwood door. Then came oak, and now we have gum, and the rivalry among these three popular native woods promises to be quite lively in the future.

Electric Motors in Woodworking Plants

THE Commercial Section of the National Electric Light Association publish from time to time interesting statistical information with regard to the electrical installation and power consumption in various kinds of woodworking factories. The installations noted do not refer to any particular locality or conditions of operating, but may be considered rather as types, for which reason they should be all the more valuable to the owners of Canadian woodworking plants. As we believe these figures will be helpful and we know they are reliable, the Woodworker will, from time to time, reproduce certain data gathered in this way. It will be noted, however, that they refer entirely to United States plants and we should be glad if any of our readers could send in data of their own plants that we may print them, and thus

assist in distributing information which would be helpful to all.

We print herewith the data in connection with the woodworking plant of Corbett & McMahon, of Mobile, manufacturers of builders' supplies. This plant is operated by what is known as the group drive. The installation consists of one 20-h.p., 1040 revolutions per minute, 220 volt, direct current motor, belted to a line shaft which drives a 36-in. band saw, an 18-in. swing cut-off saw, a 16-in. turning lathe, a post borer, a 6 x 24-in. planer, a 12-in. jointer, a 7-in. molder, a vertical shaper and a small air pump. The plant operates 56 hours per week and figures of the consumption for 11 months were as follows: February, 1014 kw.h.; March, 714 kw.h.; April, 1730 kw.h.; May, 1590 kw.h.; June, 1720 kw.h.; July, 1400 kw.h.; August, 1650 kw.h.; September, 1633 kw.h.; October, 195 kw.h.; November, 2506 kw.h.; December, 1775 kw.h. This works out to an average consumption of 1449 kw.h. per month and to an average load factor of 13.4 per cent.

Another installation belonging to Henry Bennett, of Topeka, who operates a carpenter shop, shows the following: The number of motors installed was three, with a total h.p. capacity of 17 13/24. These were installed as follows: one 7½ h.p., 500 volt motor belted to a planer; one 5 h.p., 500 volt motor belted to a planer, a mortiser and a saw; one 5-h.p., 500 volt motor, operating a band-saw and a mortiser. For the twelve months of 1911 the consumption was as follows: January, 50 kw.h.; February, 12 kw.h.; March, 9 kw.h.; April, 101 kw.h.; May, 58 kw.h.; June, 101 kw.h.; July, 62 kw.h.; August, 143 kw.h.; September, 112 kw.h.; October, 112 kw.h.; November, 180 kw.h.; December, 160 kw.h.; an average of 84 kw.h. per month. This works out to a load factor of less than one per cent.

The Value of Competent Department Foremen

By Joe Blakley

THE success of any woodworking establishment depends as much on the department managers as it does on the general manager, and the importance of these officials working in harmony cannot be overestimated. An institution with a good general manager and a staff of poor department managers is really worse off than the institution with a staff of good department managers and a poor general manager, so far as the practical part of the business is concerned. Yet either case makes a poor combination, with success hard to attain.

The really capable general manager makes it his business to secure the aid of the best he can find in the way of department managers or foremen. He realizes their value and the important part they play in making the business a success. And the more capable the general manager the quicker and surer this realization.

At the present time the demand for capable department foremen is far in excess of the supply. The ambitious woodworking mechanic has a broader field and finds opportunities for advancement more plentiful today than ever before. There are certain characteristics about the successful foreman that every ambitious woodworker should take note of, study and apply to his own case, thereby adding to his value as a mechanic, as well as fitting himself for advancement, should the opportunity present itself, which is only the natural result of concentrated effort and unfaltering ambition.

Importance of Careful Training

The steadily increasing competition in all branches of the woodworking industry makes it exceedingly difficult for the untrained foreman to make good. His chances for success are indeed poor if he has not already trained himself to be resourceful, for the multiplication of details thrust upon him demand instant decision. His judgment must be beyond dispute, even in a case where time will not permit of consideration. His knowledge of the processes and affairs of his department must be thorough. The capabilities of each workman under his supervision must be as an open book to him. He must be practical at all stages of the game, in order to establish and maintain the confidence of the general manager and the workmen under his supervision.

Workmen do not and will not give their best service when the foreman is not a recognized leader among them. A foreman armed with the respect and admiration of his workmen can, by a judicious use of such advantages, accomplish more in the way of production and low costs than by any other known means.

The art of commanding respect and admiration is one of the chief characteristics of a good foreman. If he is not naturally endowed with such art he should strive to acquire it, for without doubt it is among the most valuable assets he can possess. There are today many men holding down department foremanships who do not attach very much importance to such matters, and their success can usually be measured up accordingly. Some foremen, and even superintendents, try to purchase the respect and admiration of the men under them by granting special favors, which usually are at the expense of the firm.

Such methods are the height of folly. Respect and admiration cannot be bought on the open market in such manner, and the schemer who endeavors to make good by such means is only hastening the disaster that is surely in store for him. There is no reason why a capable foreman should resort to such means to make himself good with the men. He is only inviting disaster; the men don't appreciate it, and look upon him more in the light of an "easy mark" than of being a good fellow. It pays in the long run to give equal justice to all, and no favors at the expense of the firm.

There are many workmen who do not appreciate the position a foreman is in and the hundred and one details he has to attend to. I have often met men who would make excuses to the foreman several times daily over some trifling matter in connection with the work, that the workman himself was well qualified to cope with, then, after working hours, make their brag that they are worrying the foreman. There is only one thing to do with such men, and that is, pay them off immediately.

Such a game can be played on any foreman to a greater or less extent, for it is the foreman's duty to

give all the information he possibly can to each and every man under his charge. It shows courtesy on the part of the foreman, when consulted about such matters, if he has the patience to tolerate the man. A workman who practices such deception is only lowering the foreman's estimate of his abilities. He doesn't know but that some time this foreman may be referred to in regard to his record of service, and he could hardly expect a very flattering report. Of course, such men are not in the majority, and it is well that they are not.

Not Always Appreciated

The value of a good department foreman is not always realized or appreciated by the management. In some cases it requires a change to make the management realize that they were really in possession of a good man. Such was the case a short time ago when a department foreman in a near-by shop got a flattering offer to take charge of a similar department in another factory. The offer being a good one, he decided to consult the management about it. This he did, and while they assured him they were sorry to see him go, they could not possibly afford to pay any such price as he claimed he was offered.

After a reasonable notice he reported for duty on the new job, while his former employers engaged the man who departed from the plant where the foreman in question took charge. This happened about eighteen months ago, and the one factory is now building a big addition, while the other one is advertising for a good, competent man to take charge of the department formerly looked after by the man who accepted a larger salary.

The most successful woodworking establishments are usually the ones which pay a liberal salary to their superintendent and department foremen. They realize their value and the direct influence they have in producing dividends; and not only that, but the institution that has the reputation for paying good salaries has very little trouble in securing good, competent men when it needs them. A good reputation is just as valuable to a firm nowadays as it is to an individual, for it is not uncommon for an applicant for a salaried position to search the firm's record.

This practice is becoming more common every day, and with the increasing demand and decreasing supply of skilled help, the tendency will be for the applicant to demand references of the firm, instead of vice versa. The far-sighted manufacturer is the one who endeavors to make conditions pleasant and congenial, and as near the ideal as possible, that the workmen may be comfortable and contented.

Pleasant surroundings have a greater influence on workmen than the average manufacturer imagines. This applies as directly to the department foreman as to the workmen. The initial move in this direction must, of course, be made by the management. At least the management must be favorable to it, for the foreman is practically powerless to accomplish very much along such lines unless the management is so disposed. If more attention were given to such matters in woodworking plants there would be fewer wandering mechanics, and competent men, as well as competent foremen, would be easier to get and easier to keep.

The results from good advertising keep accumulating like the snow on the ball the boy rolls. The returns from a good ad are never all in.

Saws and Re-Saws

"Look here, waiter. I've just found this trouser button in my soup!"

The waiter hurried forward, beaming. "Oh, thank you, sir!" he said. "I couldn't imagine what had become of it."

"You seem to be an able-bodied man. You ought to be strong enough to work."

"I know, mum. And you seem to be beautiful enough to go on the stage, but evidently you prefer the simple life."

After that speech he got a square meal and no reference to the wood pile.

Quitting on Time

"Bill's going to sue the company for damages."

"Why? Wot did they do to 'im?"

"They blew the quittin' whistle when 'e was carryin' a 'eavy piece of iron, and 'e dropped it on 'is foot."

Profitable Companion

Mrs. Winks—Is your husband a good poker player?

Mrs. Binks—I don't think so. The men are always urging him to play.—Somerville Journal.

Saves Her Feelings

Miss Askit—Does your husband smoke those cigars you gave him Christmas.

Mrs. Nuwed—He smoked one and said he would keep the rest to remind him of my kindness.

One Thing Prevents

"Jasper says there is only one thing that keeps him from retiring to a farm."

"And what is that?"

"He hasn't a farm."

Woman's Love and Man's Love

"There's just two things that break up most happy homes," observed a philosopher.

"What's them?" inquired a listener.

"Woman's love for dry goods an' man's love for wet goods, b'gosh!"

As It May Happen

The kind-hearted old lady handed the beggar a dime.

"My man, how did you become so poor?" she asked. "What brought you to this terrible stage of poverty?"

"The parcel post, ma'am," replied the beggar. "You see, I used to be president of an express company."

As To Floors

"Would you like the floors in mosiac?" asked the architect.

The Springfield man looked dubious.

"Would you like the floors in mosaic patterns?"

"I don't know so much about that," he finally said. "I ain't got any prejudice against Moses as a man, and maybe he knew a lot about the law. As regards laying floors, though, I kinder think I'd rather have them unsectarian."—Harper's Weekly.

The Lighting of Workshops

THE question of light in a workshop of any kind is of the first importance. Top-lighting usually provides the best general light, whether it be natural or artificial, the diffusion usually being so much the better. In any case, the windows for the admission of natural light should be large, while the window and sash-framing should be as small as possible.

If possible, with natural top-lighting, the light should come from the north or northwest; but in any case the windows should be so arranged that the direct sunrays do not fall directly on the articles being worked on. This can be done by arranging the roofs on the ridge-and-furrow principle, with glass on the north side, and then, by carefully whitening the inside of the slated roof, very little light will be lost.

There is little need of special preparation of whitening mediums; but if ordinary ball whiting is reduced, with skimmed or separated milk, to the consistence required, and a little carbolic acid added to prevent decay, the wash will not come off, this making an annual renewal each September sufficient for all practical purposes.

Where ordinary skylights are used, a thin blind should be provided to obstruct the direct sunlight, this being on a roller conveniently placed, the blind only being used during sunshine. If treated with a weak solution of sulphate of copper, such blinds last much longer, and, as this costs little, it may well be considered.

In arranging for side-lighting as large windows as possible should be used, and these should come as low as possible, as during at least part of the year natural light is feeble.

Roller blinds of scrim should be used to obstruct direct sunlight when it becomes too powerful, and where it is desired to prevent the workpeople from too much window-gazing, rolled or otherwise obscured glass can be used without much reducing light—only the lower panes, of course, being of this material.

Paint and other substances which obstruct the passage of light should not be used for workshop window obscuration, and for temporary exclusion of very bright sunlight, blinds should always be used.

Low Power Lights

For general artificial lighting, the whole of the roof (or ceiling) and the walls should be kept whitewashed, and fairly powerful lights so arranged that the light is thrown upward and outward should be used, this causing a diffused light to be spread over everything, its intensity varying with the power of the lights used. Such lights should be well up in the place to be lighted, in all cases being three or four feet above the heads of the persons working under them.

Low power lights should also be put in for lathes and other tools, and these should be of an adjustable character. In some cases suspended lights which will slide or in some other way move vertically will be preferable, while in others simple swinging brackets with two or three joints will give the greatest service, in each case the object being to provide the most convenient form of lighting for any particular machine or process. For convenience, electric lights are about best; but very many workmen prefer gas, as this, they say, does not tire the eyes so much—a point possibly they are quite competent to judge so far as they are personally concerned.

For many temporary purposes portable appliances can be used, oil being used in conjunction with compressed air; but for numerous purposes lamps of some kind are quite a necessity, as other appliances—candles, perhaps, excepted—could not be used, owing to local conditions. Close quarters in which to work will largely govern the form of lamp used, and then, again, the vibrations caused by the use of hammers and percussive tools will render many otherwise desirable lamps impossible to use.

For these reasons, more than one form of lamp becomes necessary where general work is done, and these lamps should be kept in the stores ready for use, and when done with should be at once returned, so that they may again be got ready against the next time they are wanted.

Lighting an Individual Problem

The material on which work is done has a rather strong bearing on the methods of lighting adopted, because while one particular material, by reason of its absorbing light, will require special brilliancy of lighting, another, for the opposite reason, will require a more subdued form.

If you are working on, say, black velvet, a very strong light will be necessary; but, on the other hand, if you are working on polished metal, that light would cause such a glare and glitter that the eyes would be dazzled, and work could only be carried on in a very uncertain manner.

No fixed rule can be made as to the amount of light needed per person employed in any particular trade if calculations are based on the candlepower required; but sufficient light for each particular individual must be provided, or both work and workman will suffer, and produce a reduction in the work done.

Personally, the writer does not believe that working by artificial light produces the results which occur where only daylight is used; but, at the same time, in most places artificial light has to be used to some extent. This is unavoidable during part of the year, naturally; but in very few cases is it necessary to work overtime, if the work is properly arranged.

The new building which is being erected at Hastings Park, Vancouver, is intended for the display of every known wood found in British Columbia. It will be known as the "Forestry Building" and the only materials used in its construction will be British Columbia fir. There will be 16 huge columns of fir extending across the main facade of the building and the space between on either side of the main entrance will be filled by old-fashioned cedar shakes. The interior of the structure will consist of a large hall, 80 x 190 ft., with a gallery running around all four sides.

In order to improve the colour of certain native woods of Germany for use in the better grades of furniture, a special treatment has been tried with success. The freshly-cut wood of birch, oak, elm, pine, or spruce is buried in earth mixed with lime and other materials, and left for three to five months, which is said to impart to the wood a remarkably fine colour, so that it can be used without staining or painting. The colour changes throughout, and is supposed to be due to a change of the tanning. It is also claimed that this tanning process reduces very materially the tendency of wood to "work"—i.e., shrink and swell—so that dense hardwoods may, after treatment, be used without fear from that source.

Advertisers' Notes

This issue contains the advertisement of the Oliver Lumber Company, wholesale dealers, Toronto. They are offering a quantity of No. 1 common and better birch, No. 1 black ash, No. 2 black ash, and good basswood, also all grades of white pine. The woodworking trade will doubtless find their stocks good value.

Messrs. A. B. Ormsby, Limited, is a well-known and progressive manufacturing firm. They have recently established a fan department, under the management of Mr. W. B. Crawford, M.E., and are prepared to quote on heating and ventilating, dust collecting systems, etc. Mr. Crawford has had an extensive experience in this line in the United States.

The woodworking industry of Canada has become a very important one. This is recognized by Messrs. H. Walters & Sons, of Hull, Quebec, who are now catering to the demand for moulding cutters, mitre knives, planer knives, etc. Their announcement will be found in this issue.

The C. O. Porter Machinery Company, of Grand Rapids, Mich., have been manufacturing woodworking machinery continuously since 1885. Their machines cover a wide range, and have a reputation second to none. In this issue they bring to the attention of the woodworking trade their 24-inch single surface pony planer.

Messrs. R. C. Jamieson & Company, of Montreal, make their first announcement in this issue of the Woodworker. They are manufacturers of varnishes, japans, paints, etc., and also deal in oils, turpentine and glues. They have a wide range of varnishes for the piano and organ trade and also many special lines for furniture and cabinet makers. Jamieson's light hard oil finish is a superior varnish for interior use.

Handling Glue and Some of Its Uses

WHILE glue is an adhesive which is well known by name to probably every English-speaking person, it is surprising how little people actually know about it and the proper way to handle and make use of it; and this applies with almost as great force to many among the woodworking mechanics as it does to the general public.

Many people have knowledge of the broad fact that there is such a thing as glue and that it is made by melting the solid material in water, but they have little or no real knowledge of the details of its manufacture, nor of those pertaining to its use. To all such will doubtless be found interesting the following comments of Alexander T. Deinzer, chemist for the Deinzer Furniture Company, on the subject of glue which are taken from a contribution by him to the Wood-Worker.

Two Uses for Glue

Woodworking plants usually use glues for two purposes—joints and veneers. Glue used for joint work should be no lower in grade than 1¼ (of the standard glue grades). The writer recommends "1 Extra" and "Aex" for joint work. The amount of water that may be added to "1 Extra" is on a basis of 1 lb. of glue to a minimum of 2 lb. of water, actual weight each. On very hard and close-grained wood it may be employed on a basis of 1 lb. of glue to 3 lb. of water. For grade "Aex" 2¼ lb. of water may be taken to 1 lb. of glue, and on very hard wood 3¼ lb. of water to 1 lb. of glue. He does not recommend using over 1¾ to 2 parts of water on very hard wood, if No. 1¼ glue is used.

In order to do good joint work with glue, the glue solution must not be too thick. A thick solution congeals too quickly, hence fails to penetrate the pores of the wood; it is yielding, hence produces a weak joint. Work the glue properly into the wood with the brush, or carefully draw your pieces over the glue-spreader. Glue prepared too thin is as detrimental to the quality of the joint as though prepared too thick. The more water we add, the more we decrease its adhering power below the required point.

Glues for Veneering Purposes

Glues generally purchased for veneering purposes range in grade from 1⅝ to 1¼. The writer highly recommends 1⅜ veneer glue. His experiments have proved that this glue far surpasses the lower and even higher grades. This grade will work nicely on a basis of 1¾ parts of water to 1 part of glue, or for straight panel work, 2 parts of water may be used; however, he recommends 1¾ parts in any and all cases. This glue usually sells for from 10 cents to 12½ cents per pound.

Many manufacturers determine the quality of their glues by what they term "determining the tensile strength." Unless certain factors are taken into account it is useless to make these tests. Glue cannot be tested by the rule-of-thumb method. First, odor of glue when cooking; second, acidity or alkalinity; third, foam; fourth, grease; fifth, viscosity; sixth, jelly strength; seventh, estimation of glue contents; eighth, spread; ninth, real joint strength; tenth, careful qualitative analysis should be made of the ash of the glue after determining the moisture of, say, three grams of the ground flake dry glue. Such salts as lead carbonate, lead sulphate, salts of tungsten, etc., are very frequently added to some glues to increase adhesiveness and facilitate the drying of the solution.

Every glue user knows, or should know, that his pots must be perfectly clean. Glue must be properly soaked, and by all means do not boil the glue. Steam in direct contact with glue is very injurious, toughening and destroying its adhesive qualities.

Temperature for Glue

Have you ever figured just what it cost to reglue and repair work which in most cases was the fault of over-heated and poorly-prepared glue? It would be ludicrous if the glue salesman prescribes the exact temperature of heat to his customers; however, it is imperative that the glue does not exceed 150 deg. F. in ordinary joint work. It would be better for the glue if a lower temperature could be maintained, say 130 deg. F., yet this would be approaching the danger point in using glues. Many of the large manufacturers now prepare their glue in large cookers, making a very concentrate solution, which is permitted to jell. The jelly is then divided among workmen, who remelt the glue as they require it.

Prepare Only Enough for a Day

Prepare only enough glue at one time to last that day out. Great care should be exercised in melting the glue. Do not pour hot or warm water upon dry glue. Heat will retard the softening of the glue. Another point which may here be stated is that the surfaces to be glued must be free from grease. Grease is one of the greatest enemies to glue. Even touching the wood with greasy hands will affect the hold of the adhesive on the wood.

Before making glue joints be sure that the lumber is properly dried. Lumber too dry will cause as much trouble as when not dry enough. It takes very careful judgment in order to handle lumber stock with absolute certainty of preventing checking, joints opening, etc., under certain conditions.

Slow-Speed Low-Power Shaving and Dust Collecting Systems

Consult our Blow-Pipe Engineering Department
Our Installations are a good investment

There is a Reason

The A. B. Ormsby Company, Limited, TORONTO WINNIPEG

MACHINE KNIVES

To get the greatest quantity of work from your machines you should buy your planer knives on quality. A good knife will do more and better work and be far cheaper in the end than a poor one.

Our knives give uniformity of dimensions, uniformity of finish and are uniform in temper.

Our Guarantee. All our knives are fully warranted and will be replaced if found defective through any fault of ours.

Prices of any kind of machine knives quoted on application.

May we quote you?

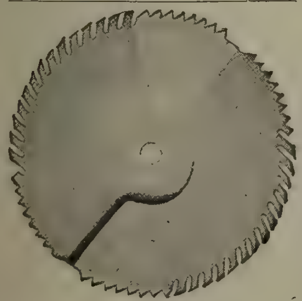
H. Walters & Sons, Limited

Hull, Quebec

LAMSON DADO AND GROOVING HEADS

Over 25,000 Now in Use

Economizers of Power, Time and Expense



SOLID

ADJUSTABLE

Both solid and adjustable. Each blade a single piece; can not get out of order. Finer outside teeth act as spurs, the larger teeth being cleaners. The head crosses the cut twice in each revolution, leaving it perfectly smooth at sides and bottom. Heads are light and do not get out of balance, like the old style heads. Make same width of groove until entirely worn out. **Special Heads to Order.**

Lamson Cutter Head Co'y.

32-36 North Jefferson St.,
CHICAGO, ILL.

Also a full line of SECOND HAND WOODWORKING MACHINERY. Send for our List and Prices—They will Save you Money

Reducing Costs and Raising Grades

A NEW machine is on the market which we believe is going to make a big change in many box factories. The manufacturers claim that this machine with one feeder, and one off-bearer will take the place of eight or even ten of the single cutting saws now used for this work.

A picture of this new Automatic Double Cut-off Saw with hopper feed is shown herewith. As regularly made it can be set to cut-off box shooks up to 6 ft. 6 in. long and 20 in. wide. For wide stock, the hopper feed is not used as the operator can easily keep the machine filled to capacity without it. For stock 3 in., 4 in., 5 in., 6 in., 7 in. and 8 in. wide, however, the hopper feed is used. The operator simply picks up the stock from the truck by the armful and dumps it into the hopper. The bottom piece always rests upon slides, between which runs a chain made of milled steel blocks. At intervals in this chain are steel dogs, which take hold of the bottom piece in the hopper, carry it under the pressure springs past the two saw blades which trim both ends exactly square, and then feed out the pieces to the off-bearer at the rear of the machine. A continuous stream of boards comes through the machine, in fact, the only limit to the quantity of the work done is the off-bearer's ability to take care of the stock as it comes out.

This chain is practically the entire mechanism of the machine, in fact, simplicity was the feature aimed at in its construction, so that any ordinary box factory employee could operate it. The chain passes over milled sprokets preventing any jumping, and each dog has a separate micrometer adjustment insuring absolute accuracy at all times.

The right hand housing in this machine is stationary, the left hand, carrying the saw, moves back and forth on wide planed ways by means of a crank operated through a rack and pinion. The machine can instantly be set to cut off to any length within its capacity.

In the large box factory, this machine should pay for itself in two to three weeks on labor-saving alone, in addition to doing more accurate work, taking up less space and requiring less power than the eight or ten hand or foot operated machines it replaces. In the small shops also, it should prove a great cost reducer. In one hour, it is claimed, it will cut off as much as the old style machine will cut off in a day. The operator can be employed on other work the remaining nine hours.

The makers claim that this machine will eventually supersede all of the others and that the box makers who realize the fact first will reap the advantages over their competitors who are slow to change to improved manufacturing methods.

Further information can be had from J. A. Fay & Egan Company, 153-173 W. Front street, Cincinnati, Ohio.

Automatic double cut-off saw.

Antique English Woodwork

The old English carpenters used good woods and they did their work well. When they built a house they constructed it to last. This is called to mind now and then when historic buildings in England are examined. One of the latest to be brought to public notice is an old house which has stood for more than 700 years near Hereford, England, and known in English local history as Rotherwas Mansion. The paneling and other interior woodwork consist of oak sycamore, acacia and yew. There were twelve rooms finished in that way, and a comparatively large amount of wood was required, since veneers and thin boards were not fashionable when that house was built. Everything was solid and massive.

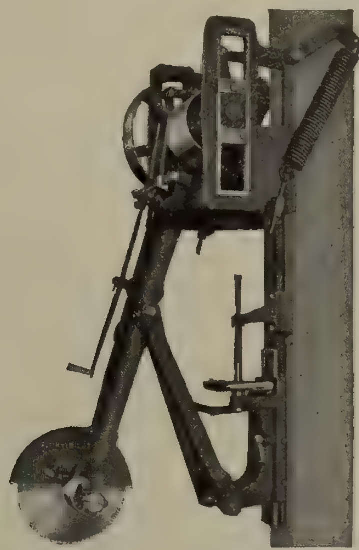
Collectors of antiques in England are expressing concern just now because of the announcement that the woodwork is to be stripped from the interior of the mansion and offered for sale at auction. It is believed that some of it, perhaps all of it, will be bought by wealthy Americans, and that English museums will miss a valuable collection of panels, posts, capitals, and other ornaments and carvings which bear the stamp of antiquity. The objects will be welcomed in this country, particularly if the purchasers should decide to place them in museums here where modern dealers and workers in wood will have an opportunity to study the venerable workmanship of old craftsmen.

Patent Fluting and Twist Machine

This machine will produce all kinds of spiral or rope mouldings, either straight, tapered, curved or oval. It will make right, left, and pineapple cuts, and will do straight and irregular fluting. It will cut from one to six threads on a piece, and will make any degree of twist from one turn in one and one-half inches of length to one in ten and one-half inches. The cutters are similar in shape and arrangement to those used on variety shapers, and are made of the same steel. They revolve always in the same direction, whether the twist be right or left, and one set will produce several different shapes of work. Changing from one degree of twist to another, or from right to left, takes less than one minute. This machine will swing eight inches, and will take 5 feet to 10 feet between centers, according to length ordered.

No. 5 Parallel Saw and Groover

This saw does not swing in an arc, but travels in a perfectly straight line. Maximum cut in one stroke with 20-inch diameter saw, 7 inches deep and 26 inches across. In tenoning, etc., remaining margin is the same thickness irrespective of thickness of lumber Specially adaptable for gaining, grooving and rabbeting.



P. Pryibil Machine Company

512-524 W. 41st Street - - - New York City

IF INTERESTED IN WOODWORKING MACHINERY, WRITE US

The News—From Coast to Coast

Robertson & Son, Manitou, Man., have moved their furniture business to Redcliffe, Alta.

Baird & McKenzie, contractors, Red Deer, Alta., are adding a planing mill to their plant.

The four woodworking factories at Sydney, N.S., are having an exceptionally heavy run of business.

The Quality Furniture Makers, Limited, have incorporated. Their place of business will be Welland, Ont.

The Northern Planing Mills, North Bay, Ont., have changed their style to Northern Planing Mills, Limited.

Kent-McClain, Limited, shoe case and store fittings, Toronto, have been licensed in the province of British Columbia.

Fire last month broke out in the premises of the Alberta Box Company at Calgary, causing damage to the extent of $12,000.

Cyprien Charron and Donat Charron of St. Therese, Que., have been registered to carry on business as manufacturers of doors, etc.

The Wormwith Piano Company, Limited, of Kingston, Ont., has been reorganized. The capital stock of the new company is $500,000.

Haley & Son, who conduct a saw mill and woodworking business at St. Stephen, N.B., have changed their style to Haley & Son, Limited.

Messrs. Wm. Rutherford and M. Merriman will erect a Woodworking factory, to cost $15,000, at Powell, B.C. It will employ at least 20 men.

Hannon & Kellet, blacksmiths and wood makers, of Woodstock, Ont., have moved into new quarters on Finkle street, just south of Peel street.

Arbuthnot's sash and door factory at Fort Rouge, Man., was burned last month. The damage, which is covered by insurance, is estimated at $25,000.

R. B. C. Urian, J. Almon and Mark Andrews have registered to carry on a planing mill business at Sydney, N.S., under the style of Andrews Bros.

The Beverley Wood Specialty Company, Limited, has been organized with a capital of $50,000. They will carry on a woodworking business in the city of Toronto.

The striking employees at The Risteen Company's woodworking factory, Fredericton, N.B., have returned to work having been granted the nine-hour day which they demanded.

The Shields Lumber Company, Limited, of Kamloops, B.C., has been incorporated with a capital stock of $500,000. They will conduct a planing mill, saw mill and general lumber business.

The Peterman Manufacturing Company, of Tacoma, Wash., have secured a provincial charter in British Columbia, which enables them to conduct a lumbering and woodworking business.

The Hagersville Furniture Company, Limited, is the name of a new concern recently incorporated with headquarters at Hagersville, Ont. The capital stock of the company is $40,000.

Wood-Mosaic Company, Inc., of New Albany, Ind., one of the oldest and largest firms in the United States, has decided to locate a plant at Stratford, Ont. At the outset about 100 hands will be employed and an investment of $100,000 will be represented in the plant. Their principal lines are built-up veneer tops and panels, also hardwood flooring.

The Bridge River Timber Company, Limited, of Vancouver, B.C., have been organized with a capital of $350,000. Their charter permits them to operate planing mills.

Fire recently destroyed the big planing mill and other property owned by W. L. McManus Lumber Company, located at Petoskey, Mich. The loss is estimated at $200,000. There was no insurance.

The Royston Saw Mill Company, Limited, has been organized with a capital stock of $20,000. Their place of business will be at Cumberland, B.C., and their charter permits of their establishing a sash and door factory.

The Peace River Mining & Milling Company, Limited, has been incorporated at Vancouver, B.C., with a capital of $2,000,000. They will conduct a saw and planing mill business and manufacture woodenware as well.

The Cockburn Lumber & Concrete Company, Limited, have been organized with a capital of $100,000. The company will erect a sawmill at Dundas, Ont., and will also manufacture mouldings, doors and window sashes.

The Cranbrook Sash and Door factory had a narrow escape from fire one day last week when the grass caught from the sparks of the Kimberley fire, fortunately S. L. Williams was able to extinguish the flames before any damage was done.

Mr. John Waugh, who owns a planing mill and lumber yard at Niagara Falls, Ont., reports business as being exceptionally brisk. He manufactures interior woodwork of every description, representing columns, sash, doors, blinds, mouldings, frames, etc.

Canada's Furniture Manufacturers had an exhibit on the Made-in-Canada train recently that attracted considerable attention. This firm operate twelve furniture factories in different parts of Ontario as well as a line of reed goods and baby carriages at Walkerton, in the same province.

The veneer factory of the Escanaba Veneer Company, located at Sutton, Que., was recently destroyed by fire, the loss being estimated at some $75,000. Besides the plant considerable stock was destroyed. It is reported that there was about $50,000 insurance on the stock and plant.

The Scotstown Manufacturing Company, Limited, has been organized with a capital stock of $150,000, the head office being at Scotstown, Que. Their charter permits of their engaging in the manufacture of all articles of wood used for decorating and furnishing houses, and in the furniture manufacturing business.

Messrs. J. Wells, J. Weber, C. Derbecker, A. Weinert, A. Dunemann, D. Lippert and J. Moliter have been named as provisional directors for the Newstadt Furniture Company, Limited, recently incorporated with a capital of $20,000, to manufacture furniture of all descriptions. The head office is to be at Newstadt, Ont.

A fatal accident occurred recently at the plant of the London & Petrolia Barrel Works, London, Ont., when a man named Lechota, a Russian employed in the factory, met his death. He had only recently entered the employment of the firm and was dragging logs onto rollers when he was drawn between the saws and cut to pieces.

Under the firm name of The Wickham Furniture Company, Limited, Messrs. E. Decelles, E. Lupien, W. Lupien, G. Tetrault, N. Girard and V. Lemire were recently incorporated

Cotton and Wool Waste and Acme Sanitary Cotton Wiping Cloths

for Power Houses, Packing Houses, Engine Rooms, and anywhere and everywhere where machinery is used.

Special value in Egyptian Cream and other polishing wastes for Furniture and Piano Manufacturers.

Our prices are the lowest and our quality the highest. It will pay you to get in touch with us. We shall be glad to make your acquaintance and you will be just as glad when you have made ours. We are the largest Manufacturers and Dealers in Canada.

Buy from us and support Canadian Industry

H. GRAY & CO'Y., 24-26 Dalhousie St., TORONTO
Factory, Montreal

"Pioneer" Moulding Sander Power Veneer Presses

Cabinet Clamp

Veneer Press

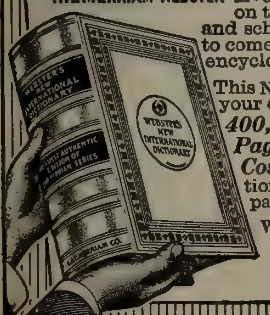
Write for Catalogue and Prices

Chain Clamp

Black Bros. Machinery Co.
Mendota, Ill.

Column Clamp

"Just the Information We Need"
WEBSTER'S NEW INTERNATIONAL



—THE MERRIAM WEBSTER Every day in your talk and reading, on the street car, in the office, shop, and school some new question is sure to come up. You seek quick, accurate, encyclopedic, up-to-date information.

This NEW CREATION will answer *all* your questions with *final* authority. *400,000 Words Defined. 2700 Pages. 6000 Illustrations. Cost $400,000.* The *only* dictionary with the new divided page. A "Stroke of Genius."

Write for specimen pages, FREE.

G. & C. MERRIAM CO., SPRINGFIELD, MASS.

BOOKS
For Sale

The following books are offered at special prices subject to previous sale:

A Practical Treatise on the Steel Square, by Fred T. Hodgson. Published by Frederick J. Drake & Company, Chicago. Two volumes. Price 50c each.

Common-sense Handrailing, by Fred T. Hodgson. Published by Frederick J. Drake & Company, Chicago. 114 pages, illustrated. Price 50c.

The Contractors' and Builders' Handbook, by William Arthur. Published by David Williams Company, New York. 378 pages. Price $1.00.

Plank Frame Barn Construction, by John L. Shawver. Published by David Williams Company, New York. 34 pages, illustrated. Price 50c.

How to Mix Paints, by C. Godfrey. Published by Industrial Publication Company, New York. 64 pages, illustrated. Price 50c.

Roof Framing Made Easy, by Owen B. Maginnis, Published by The Industrial Publication Company, New York. 164 pages, illustrated. Price 50c.

Handrailing Simplified, by An Experienced Architect. Published by William T. Comstock, New York. 52 pages, illustrated. Price 50c.

Architects' and Engineers' Hand-Book of Reinforced Concrete Construction, by L. J. Mensch. Published by the Cement & Engineering News, Chicago, Ill. 216 pages, illustrated. Price 50c.

A Simple Treatise on Architectural Perspective for Beginners, by I. P. Hicks. Published by Industrial Publication Company, New York. 36 pages, illustrated. Price 50c.

Practical Centering, by Owen B. Maginnis. Published by William T. Comstock, New York. 80 pages, illustrated. Price 50c.

Richey's Guide and Assistant, by H. G. Richey. Published by William T. Comstock, New York. 176 pages, illustrated. Price 50c.

How to Join Mouldings; or, The Arts of Mitering and Coping, by Owen B. Maginnis. Published by William T. Comstock, New York. 72 pages, illustrated. Price 50c.

The Book of Lumber Shed Construction, by Met L. Saley. Published by American Lumberman, Chicago. 176 pages, illustrated. Price $1.00.

Wallpapers and Wall Coverings, by Arthur Seymour Jennings. Published by William T. Comstock, New York. 160 pages, illustrated. Price 50c.

Woodworking Safeguards, by David Van Schaack. Published by AEtna Life Insurance Company, Hartford, Conn. 216 pages, illustrated. Price 50c.

Furniture Designing and Draughting, by Alvan Crocker Nye. Published by William T. Comstock, New York. 100 pages, illustrated. Price $1.00.

Estimating, by Edward Nichols. Published by American School of Correspondence, Chicago. 112 pages, illustrated. Price 50c.

Steam Power Plants—Their Design and Construction, by Henry C. Meyer. Published by McGraw Publishing Company, New York. 158 pages, illustrated. Price 50c.

Popular Mechanics Shop Notes, Published by Popular Mechanics, Chicago. Easy Ways to do Hard Things, etc. Years 1905-1906-1907-1908-1909. Price 40c each.

Woodworker Publishing Company, Limited
Nicholls Building
Toronto, - Ontario

with a capital of $99,000 for the purpose of manufacturing all kinds of furniture, doors, sashes and other articles of wood. The head office is situated at West Wickham, P.Q.

The A. K. Wisner Carriage Co., Limited, has been organized with a capital stock of $40,000. A plant will be erected at Jordan, Ont., for the manufacture of wagons and buggies and also woodenware of all descriptions.

The Laberge Lumber Company, Limited, has been incorporated with a capital of $100,000 to carry on business as general contractors and builders, manufacturers and dealers in logs, timber, lumber and other wood products, with head office at Sudbury. The provisional directors are J. A. Laberge, J. B. Laberge and Louis Laforest, contractors, all of Sudbury.

Fire broke out recently in the cooperage building of Scarge & Son, of Brantford, Ont., damage to the amount of about one thousand dollars being done. The building is a frame structure covered with galvanized iron and about 30 feet by 40 feet in size. It is also used as a store room for empty barrels. The boiler and engine of the plant were fortunately not damaged.

The Big River Lumber Mill, near Prince Albert, Sask., was recently destroyed by fire, with a loss of $500,000. It was one of the largest mills on the continent and had a capacity of 600,000 feet daily. There were 30,000,000 feet of lumber in the yards at the time. Sir William Mackenzie, of Toronto, is a director and Col. Davidson, formerly of Duluth, is president of the company.

The well equipped planing mill of the Edgewood Lumber Company, Limited, at Castlegar Junction, Nelson district, was destroyed by fire last month, the loss being in the neighborhood of $14,000. A good insurance was carried. Wm. Waldie, general manager, promptly installed a planer in connection with the sawmill to take care of pressing orders while a new planing mill is being erected.

The Niagara Falls Planing Mills Company, operated under the direction of Mr. C. N. Clendenning, are having a record season and it is expected that more than one million feet of material will be manufactured this year. This factory gives employment to about 15 men and turns out doors, sash, blinds, boxes, and everything in interior construction.

One of the latest flourishing industries established in Fort William, Ont., is the sash, door and woodworking plant of Messrs. Springett & Breding. Although this firm have been located there for some time they have just completed and opened a fine new plant served by the Canadian Pacific Railway spur track on Christina street. They have a staff of thirty-five men which will be increased as the business of the new enterprise warrants.

The Handy Man

Where the tables tip to starboard
And the bookracks lean to port.
Where crude, homemade things are harbored,
Does the handy man disport;
With his hammer, saw and brace
Making things his home to grace
He will make a tabouret
Or a kitchen cabinet
With the lumber in an empty packing-case.

Padded seats for hall or bedroom
He'll construct with all dispatch.
He will paint a green or red room
And will paper it to match.
Oh, the wabbly chair he makes,
And the tables with the shakes,
And the mission desks of pine
Stained and varnished till they shine,
And with putty trying hard to hide mistakes!

Though his hands are bruised and battered,
And his thumbs are wrapped in rags,
Still he works 'mid sawdust scattered,
And his ardor never flags;
And his plea for each offence
Is the saving of expense,
So he pounds and saws away—
He will labor half a day
Making something he could buy for fifteen cents.

—Walter G. Doty in the Farm Journal.

Mr. R. J. Hutcheson, president of the Muskoka Wood Manufacturing Company, Limited, Huntsville, Ont., reports the factory is running night and day in an endeavor to keep pace with their orders for flooring. Within the next two months they will more than double their present output, and they are installing a 700 h.p. Corliss engine. They have recently added three-quarters of a million feet to their storehouse capacity. In their new factory they are putting in Berlin machines for manufacturing flooring.

Practical Books for Woodworkers

Problems in Furniture Making, by F. D. Crawshaw. Elementary. Deals ably with questions of design, construction and wood finishing. 58 pages, illustrated. Price $1.00.

Expert Wood Finisher, by A. Ashmun Kelly. Describes woods used by finishers, explains fillers and filling, fuming and finishing, stains, formulas, troubles and defects, general information and a glossary. 340 pages. Price $3.00.

Glue Handling, by Friman Kahrs. A dozen chapters of general information on glue, glue handling, errors in factory testing, glue qualities, etc. Price $1.00.

Saw Fitting Manual, a Treatise on the Care of Saws and Knives. Deals with everything in the saw and knife alphabet, from Adjustments to Widths. 144 pages. Price $2.00.

Progressive Carpentry, by H. D. Meloy. Results of a study of all known methods of construction. Many valuable improvements sent forth and explained, including a system of framing roofs. 80 pages, illustrated. Price $1.00.

The Art and Craft of Cabinetmaking, by D. Denning. Chapters on the distinction between cabinetmaking and joinery; development of furniture, glue, veneering, table construction, drawing and designing. 320 pages, illustrated. Price $1.50.

Wood-turning, by George H. Resides and Hugo Diemer, M.E. Deals with woodworking and with patternmaking, describes standard types of woodworking machinery with particulars of their operation. 160 pages, illustrated. Price $1.50.

Send your orders to

Woodworker Publishing Company, Limited

Nicholls Building, Toronto

BUYER'S DIRECTORY

AUTOMATIC DOVETAIL GLUE JOINTER
Canadian Linderman Machine Co., Ltd., Woodstock, Ont.

AUTOMATIC GLUE CLAMP CARRIER
Nels J. Billstrom, 1315 Tenth street, Rockford, Ill.

BABBITT METALS
Shurly Dietrich Co., Ltd., Galt, Ont.
Fay & Egan Co., Cincinnati, O.
Canada Metal Co., Ltd., Toronto.

BALUSTER LATHES
C. Mattison Machine Works, Beliot, Wis.
Thos. White & Sons, Paisley, Scotland.
Chicago Machinery Exchange, Chicago, Ill.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.
Canada Machinery Corp., Ltd., Galt, Ont.

BAND SAW FILING MACHINERY
Shurly Dietrich Co., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

BAND SAWS
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Shurly Dietrich Co., Ltd., Galt, Ont.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
R. H. Smith Co., Ltd., St. Catharines, Ont.

BAND SAW MACHINERY
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
H. W. Petrie, Ltd., Toronto.

BAND SAW MILLS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., Cincinnati, Ohio.

BAND SAW STRETCHERS
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

BENDING MACHINES
Fay & Egan Co., Cincinnati, Ohio.

BELTING
J. A. Fay & Egan Co., Cincinnati, Ohio.
Sadler & Haworth, Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
H. W. Petrie, Ltd., Toronto.

BELTS (Endless)
Candada Machinery Agency, Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Sadler & Haworth, Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
H. W. Petrie, Ltd., Toronto.

BELT CEMENT
Sadler & Haworth, Montreal.

BELT FASTENERS
Sadler & Haworth, Montreal.

BELT DRESSING
Sadler & Haworth, Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

BLOWERS
Sheldons Limited, Galt, Ont.
H. W. Petrie, Ltd., Toronto.

BLOW PIPING
Cyclone Blow Pipe Company.
Sheldons Limited, Galt, Ont.

BOILERS
Canada Machinery Agency, Montreal.
H. W. Petrie, Limited. Toronto.

BORING MACHINES
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Mussens, Limited, Montreal.
J. M. Nash, Milwaukee, Wis.
Valley City Machine Works, Grand Rapids. Mich.
H. W. Petrie, Limited, Toronto.

BOX MAKERS' MACHINERY
Canadian Linderman Co., Ltd.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.

BROKEN CASTINGS BRAZED—MACHINIST AND DIE MAKER
W. H. Dunne, 1492 Queen St. West, Toronto.

CABINET PLANERS
Canada Machinery Corporation, Ltd., Galt, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Agency, Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Valley City Machine Works, Grand Rapids, Mich.
Baxter D. Whitney & Son, Wichendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Ltd., Toronto.

CARS (transfer)
Sheldons Limited, Galt, Ont.

CARVING MACHINES
Canada Machinery Corporation, Ltd., Galt, Ont.
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Hespeler Machinery Co., Ltd., Hespeler, Ont.
Valley City Machine Works, Grand Rapids, Mich.

CHISELS
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

CIRCULAR SAW MILLS
Canada Machinery Agency, Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
H. W. Petrie, Limited, Toronto

CHAINS (Silent)
Jones & Glassco, Montreal

CLAMPS (Chain, Carpenter, Cabinet, Pattern Makers, Bench, Mitre, Piling, Mounted and Rotary Wheel)
Batavia Clamp Company, Batavia, N.Y.
Black Bros. Machinery Co., Mindota, Ill.
J. A. Fay & Egan Co., Cincinnati, Ont.

CLAMPS (Saw)
Shurly Dietrich Co., Ltd., Galt, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

CLUTCHES
J. A. Fay & Egan Co., Cincinnati, Ohio.

COLUMN CLAMPS
Black Bros. Machinery Co., Mendota, Ill.

COLUMN MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.

CORE BOX MACHINES
J. A. Fay & Egan Co., Cincinnati, Ohio.
Chicago Machinery Exchange, Chicago, Ill.
E. & B. Holmes Machinery Co., Buffalo, N.Y.

CUT-OFF SAWS
Canada Machinery Corporation Ltd., Galt, Ont.
Shurly Dietrich Co., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Berlin Machine Works, Ltd., Hamilton, Ont.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

CUTTER HEADS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Lamson Cutter Head Company.
Samuel J. Shimer & Sons, Milton, Pa.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

DADO HEADS
C. Mattison Machine Works, Beloit, Wis.
Fox Machine Company, Grand Rapids, Mich.
W. A. Elliott, Bathurst and College Sts., Toronto.

DIEMAKERS & MACHINISTS
W. H. Dunne, 1492 Queen St. West, Toronto.

DISK GRINDERS
J. A. Fay & Egan Co., Cincinnati, Ohio.

DOGS (Saw Mill)
J. A. Fay & Egan Co., Cincinnati, Ohio.

DOVETAILING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canadian Linderman Machine Co., Ltd., Woodstock, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

DOWEL MACHINES
Thos. White & Sons, Paisley, Scotland.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Dauber-Bell Machine Company.
J .A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Valley City Machine Works, Grand Rapids, Mich.

DRYING MACHINERY
Sheldons Limited, Galt, Ont.
Morton Dry Kiln Co., Chicago, Ill.

DRY KILNS
Sheldons Limited, Galt, Ont.
Morton Dry Kiln Company, Chicago, Ill.

DUST COLLECTORS
Sheldons Limited, Galt, Ont.

DUST SEPARATORS
Sheldons, Limited, Galt, Ont.

EDGERS (Gang)
Berlin Machinery Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

EDGERS (Single Saw)
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Agency, Montreal.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

END MATCHING MACHINE
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

ENGINES (Steam)
H. W. Petrie, Limited, Toronto.

EXHAUST FANS
Sheldons, Limited, Galt, Ont.

FLOORING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corporation, Ltd., Galt, Ont.
Baxter D. Whitney & Son, Winchendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

FLINT
Wausau Quartz Co., Wausau.

FLUTING HEADS
J. A. Fay & Egan Co., Cincinnati, Ohio.

FLUTING AND TWIST MACHINE
Pryibil Machine Co., P., New York.

GAINING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Canada Machinery Corporation, Ltd., Galt, Ont.
H. W. Petrie, Limited, Toronto.

GAS ENGINES
H. W. Petrie, Limited, Toronto.

GAUGES (Saw)
Shurly Dietrich Co., Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver B. C.

GLUE CLAMPS
Batavia Clamp Company, Batavia, N.Y.
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.

GLUE HEATERS
J. A. Fay & Egan Co., Cincinnati, Ohio.

GLUE JOINTERS
Canada Machinery Corporation, Ltd., Galt, Ont.
Canadian Linderman Company, Limited, Woodstock, Ont.
Chicago Machinery Exchange, Chicago, Ill.

GLUE SPREADERS
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

GRINDERS (Cutter)
J. A. Fay & Egan Co., Cincinnati, Ohio.

GRINDERS (Knife, etc.)
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

GRINDERS (Tool)
J. A. Fay & Egan Co., Cincinnati, Ohio.
Valley City Machine Works, Grand Rapids, Mich.

GROOVING HEADS
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Samuel J. Shimer & Sons, Milton, Pa.
Canada Machinery Corporation, Ltd., Galt, Ont.

HAND PROTECTORS
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Jones Safety Device Co., Hamilton, Ont.

HAND SCREWS
Black Bros. Machinery Co., Mendota, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

HEATING APPARATUS
Sheldons, Limited, Galt, Ont.

HANDLE AND SPOKE MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
J. M. Nash, Milwaukee, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.

HUB MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

HYDRAULIC VENEER PRESSES
Wm. R. Perrin & Co., Ltd., Toronto.

INJECTORS
H. W. Petrie, Limited, Toronto.

JOINTERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canadian Linderman Co., Ltd., Woodstock, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Plessisville Foundry, Plessisville, Que.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

KNIFE GRINDERS
Rogers & Coampany, Samuel C.

KNIVES (Planers and Others)
Shurly Dietrich Co., Ltd., Galt, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Samuel J. Shimer & Sons, Milton, Pa.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
H. W. Petrie, Limited, Toronto.

LACE LEATHER
Sadler & Haworth, Montreal.

LATHES (Pattern Makers')
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Valley City Machine Works, Grand Rapids, Mich.
H. W. Petrie, Limited, Toronto.
Thos. White & Sons, Paisley, Scotland.

LATHES (Turning)
Berlin Machine Works, Lid., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Valley City Machine Works, Grand Rapids, Mich.
Baxter D. Whitney & Son, Winchendon, Mass.
H. W. Petrie, Limited, Toronto.

LOOSE PULLEYS
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corporation, Ltd., Galt, Ont.

LUBRICANTS AND GREASES
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.

LUMBER
Anderson Lumber Company, C. G.
Elgie & Jarvis, Toronto.
Oliver Lumber Company, Toronto, Ont.

MACHINE KNIVES
Walters & Sons, H., Hull, Que.

MITRE MACHINES
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N. Y.
H. W. Petrie, Limited, Toronto.

MITRE SAWS
Shurly Dietrich Co., Ltd., Galt, Ont.
E. C. Atkins & Co., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corporation, Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

MITRE CLAMPS
Batavia Clamp Company, Batavia, N.Y.
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.

MORTISING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Jones & Glassco, Montreal.
Valley City Machine Works, Grand Rapids, Mich.
H. W. Petrie, Limited, Toronto.

MOTORS
J. A. Fay & Egan Co., Cincinnati, Ohio.

MULTIPLE BOXING MACHINES
J. A. Fay & Egan Co., Cincinnati, Ohio.
J. M. Nash, Milwaukee, Wis.

PACKINGS
Both Felt Company

PAINTS AND VARNISHES
Jamieson & Co., R. C., Montreal.

PATTERN SHOP MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

PICTURE FRAME MACHINERY
Black Bros. Machinery Co., Mendota, Ill.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.

PLANES
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corp., Ltd., Galt, Ont.

PLANERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.
Porter Mach. Co., C. O., Grand Rapids, Mich.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

PLANING MILL MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Chicago Machinery Exchange, Chicago, Ill.
C. Mattison Machine Works, Beloit, Wis.
Pryibil Machine Co., P., New York, N.Y.
Samuel J. Shimer & Sons, Milton, Pa.
Baxter D. Whitney & Son, Winchendon, Mass.
Black Bros. Machinery Co., Mendota, Ill.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie Co., Ltd., Toronto.

POLISHING MATERIAL
Gray & Company, H.

PULLEYS
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

RESAWS
Shurly Dietrich Co., Ltd., Galt, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

RESAWS
H. W. Petrie, Limited, Toronto.

RIM AND FELLOE MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corp., Ltd., Galt, Ont.

RIP SAWING MACHINES
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Canada Machinery Corp., Ltd., Galt, Ont.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

SAFETY GUARDS (For Band Saw Machines, Jointers, Rip Sawing Machines, Shapers, Swing Saws, etc.)
Chicago Machinery Exchange, Chicago, Ill.
Fair Manufacturing Company, Racine, Wis.
Jones Safety Device Co., Hamilton, Ont.

SANDERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
J. M. Nash, Milwaukee, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Fisher Sander Co., Berlin, Ont.
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.
Elliot Woodworker Co., Toronto.

SANDPAPER
Black Bros. Machinery Co., Mendota, Ill.

SANDERS (Moulding, Belt and Panel)
Black Bros. Machinery Co., Mendota, Ill.
Chicago Machinery Exchange, Chicago, Ill.
H. W. Petrie, Ltd., Toronto.

SASH, DOOR INTERIOR TRIM AND COLUMNS
M. Brennan & Sons, Hamilton, Ont.

SASH, DOOR AND BLIND MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Samuel J. Shimer & Sons, Milton, Pa.
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.

SAWS (Hand)
Shurly Dietrich Co., Ltd., Galt, Ont.
E. C. Atkins & Co., Hamilton, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

SAW MILL MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
H. W. Petrie, Limited, Toronto.

SAW SWAGES, AUTOMATIC FILERS
E. C. Atkins & Co., Hamilton, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.

SAW TABLES
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

SCRAPING MACHINES
Baxter D. Whitney & Son, Winchendon, Mass.
Chicago Machinery Exchange, Chicago, Ill.

SCROLL SAWS
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Shurly Dietrich Co., Ltd., Galt, Ont.
E. C. Atkins & Co., Hamilton, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.

SECOND HAND MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
H. W. Petrie, Limited, Toronto.

SHAPERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Samuel J. Shimer & Sons, Milton, Pa.
Baxter D. Whitney & Son, Winchendon, Mass.
H. W. Petrie, Limited, Toronto.

SHAVING COLLECTORS
Ormsby Company, A. B., Toronto.
Sheldons, Limited, Galt, Ont.

SINGLE SPINDLE BOXING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.

STAVE SAWING MACHINE
Baxter D. Whitney & Son, Winchendon, Mass.

STORE FIXTURES, FITTINGS
Reflector & Hardware Specialty Mfg. Co. Chicago, Ill.

SURFACERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.
Chicago Machinery Exchangefi, Chicago, Ill.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

SWING SAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

TABLE LEG LATHES
Berlin Machine Works, Ltd., Hamilton ,Ont.
Chicago Machinery Exchange, Chicago, Ill.
Thos. White & Sons, Paisley, Scotland.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.

TENONING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
H. W. Petrie, Limited, Toronto.

TOOLS (Hand)
J. A. Fay & Egan Co., Cincinnati, Ohio.
Samuel J. Shimer & Sons, Milton, Pa.

TRIMMERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

TRUCKS
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Sheldons, Limited, Galt, Ont.

TURNING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.
H. W. Petrie, Limited, Toronto.

UNDER-CUT SELF-FEEDING FACE PLANER
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.

GUMMERS, ETC.
E. C. Atkins & Co., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

UNIVERSAL WOODWORKER PLANER
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
W. A. Elliot, Bathurst St., Toronto, Ont.
H. W. Petrie, Limited, Toronto.

VENTILATING APPARATUS
Sheldons, Limited, Galt, Ont.

VENEER DIERS
Sheldons, Limited, Galt, Ont.

VENEER PRESSES (Hand and Power)
Hydraulic Press Mfg. Co., Mount Gilead, Ohio.
Black Bros. Machinery Co., Mendota, Ill.
William R. Perrin & Company, Toronto, Ont.

VISES (Band Saws)
Shurly Dietrich Co., Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
H. W. Petrie, Limited, Toronto.

VISES (Pattern Makers')
J. A. Fay & Egan Co., Cincinnati, Ohio.

VISES (Circular Saws)
E. C. Atkins Co., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
H. W. Petrie, Limited, Toronto.

WAGON AND CARRIAGE MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.

WASHERS
Booth Felt Company

WASTE, COTTON
Gray & Company, H.

WIPING MATERIAL
Gray & Company, H.

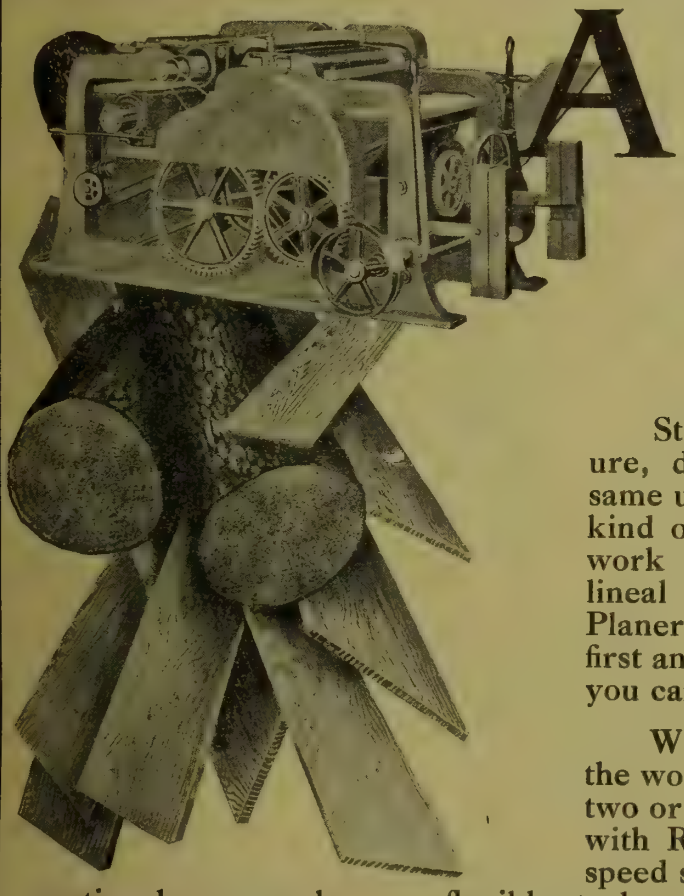
WINDOW FRAME MACHINERY
Smith & Phillips Mfg. Co., Chicago, Ill.

WOOD PULLEYS
Canada Machinery Agency, Montreal.

WORK BENCHES
Canada Machinery Agency, Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio

Volume Thirteen TORONTO, JULY, 1913 Number Seven

Canadian Woodworker



A PLANING MACHINE that is the Last Word in Mechanical Perfection ; a Machine Designed Specifically to Reduce the cost of High Grade Surfacing, is

The Whitney Planer

Single or Double Surfacer

Standing up to the most extreme pressure, day after day, producing always the same uniformly good surfacing on whatever kind of lumber is brought to it, doing this work at a speed that counts, counts up in lineal feet and profits earned ; a Whitney Planer will pay you better as an investment, first and last, than any other planing machine you can buy.

We equip your machine according to the work you do, with square cylinders and two ordinary knives, or with four knives, or with Round Cylinders and four thin high-speed steel knives ; sectional rolls and steel sectional pressure bars, or flexible steel pressure pads.

Write for the New Catalog and full particulars

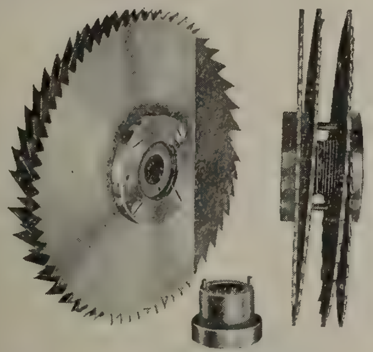
Baxter D. Whitney & Son, Winchendon, Mass.

Pacific Coast Sales Department: H. H. Plummer, Mgr.
Pacific Building, Seattle, Wash.

Selling Representatives: Henry Kelley & Co.
26 Pall Mall, Manchester, England.

Trade **FOX** Mark

ADJUSTABLE



DADO HEADS

These heads, when open, cut a groove twice the width of groove cut with head closed, and they will cut absolutely any width between these extremes.

Write for Descriptive Literature

FOX MACHINE CO.

645 Front Ave., N.W., GRAND RAPIDS, MICH.

The M. Brennen & Sons Mfg. Co., Limited

LUMBER DEALERS **PLANING MILL**

Manufacturers of Doors, Frames, Sash, etc.
Trim and all kinds of Mouldings

Detail Work a Specialty

Rough and Dressed Lumber, Lath and Shingles

We are always glad to Furnish Estimates.
Prompt delivery our Specialty. Write for Price Lists.

Box 107 **HAMILTON, ONT.**

Clinch the Orders for Window Frames

Machine does everything shown.

While there is always competition on this class of work, the manufacturer who has installed a

Perfect Window Frame Machine

can always land the order with a good profit, at a price that would lose money in a shop not equipped with this machine.

Our catalogue will make plain where the saving is.

Smith & Phillips Mfg. Co.

412-422 N. Sangamon Street, CHICAGO, ILL.

Better ask for particulars of our Stair Router, Edge Jointer, Sash Groover and Light Shaper, an ingenious and effective tool.

Hydraulic Veneer Press

We build these presses in all sizes and styles for all kinds of Veneer work

Write us for Price

William R. Perrin & Company

Limited

TORONTO

Canadian Woodworker

Canada's Only Woodworking Paper

Published in the interests of Planing Mills, Saw Mills, Furniture and Piano Factories, Implement and Carriage Works, Boxmakers and Coopers, Carpenters and Builders.

The Circulation extends from the Atlantic to the Pacific and covers thoroughly all classes of Woodworkers in this immense territory.

Wooodworker Publishing Co., Limited

Nicholls Building Toronto, Canada

MONTREAL - - - - - - - - Board of Trade Building
NEW YORK - - - - - - - - - - - Tribune Building
CHICAGO - - - - - - - - - - - 659 Peoples Gas Bldg.
LONDON, ENG. - - - - - - - - 3 Regent Street, S.W.

SUBSCRIPTION RATE.

Canada, United States, $1.00; Great Britain, Australia 4s 6d.; other countries $1.50 per year. Advertising rates on request.

Vol. 14 July, 1913 No. 7

Financial Conditions and the Outlook

It is only history repeating itself that a period of financial depression should follow one of marked activity. The present moderate depression, however, should not cause widespread unrest throughout the commercial and industrial community. Underlying conditions are absolutely sound and Canada's proverbial resiliency will doubtless be reflected in the early return of confidence to business circles.

In order to understand the state of trade and commerce in the Dominion it may be well to glance at the monetary conditions of some of the leading nations. The financial and commercial organization of the world is of so delicate an adjustment, that a disturbance in any one part is naturally felt in others to some extent. Some of the European financiers trace the beginning of the stringency back to the Morocco incident, when Germany was forced to recede from her position through the withdrawal of loans by other nations. To prevent a recurrence of such an unpleasant situation the German Empire has since been hoarding gold. The Balkan war, however, is generally held responsible for the present crisis. War inevitably produces commercial depression. It often ends in the bankruptcy of one or all of the nations engaged. It is impossible to withdraw money from the ordinary commercial enterprises and use it for the accumulation of vast war stores and in the equipment of enormous forces; it is impossible to withdraw thousands of men from peaceful pursuits and support them as non-producers, without disturbing the world's trade. So, with the great continental powers hoarding their gold and mobilizing their armies, and private lenders in alarm withdrawing their loans, very little money has been available to finance regular business enterprise. The European outlook has vastly improved, but confidence will not be completely restored until the diplomats now in London arranging the financial basis of the Balkan peace, have completed their task.

Germany, as a result of her attempts to keep in a state of naval, military and financial preparedness, is running her business on bank credits and, as the banks curtailed their credits during the period of hostilities, the manufacturing output has been greatly lessened and trade seriously embarrassed. In England the stringency was augmented by labor unrest and costly and destructive strikes. The United States, in sympathy with the world markets, felt the money scarcity severely; this lack of ready capital was further accentuated by local conditions. Uncertainty arising from proposed tariff changes, the "anti-capital" attitude of the government as it is termed by one coterie of critics, the projected reorganization of the banking system, the refusal of the Interstate Commerce Commission to advance freights, and the conduct of the money trust—these, operating conjointly, have caused a depreciation in the value of the best American securities, reaching, it is estimated, the enormous sum of $3,000,000,000. However, uncertainty is now apparently giving place to confidence.

In Canada the money tightness has been intensified by peculiarly national causes. Undoubtedly there has been excessive land speculation and municipal expansion, and this very expansion is in itself a cause of money scarcity. The Northwest farmer has not been receiving adequate returns. What with lack of storage facilities, high transportation rates, and the necessity for immediate sale, at low prices, to meet pressing liabilities, the profits have been, on the whole, small. Add to this the difficulty of procuring loans even at a high rate of interest, and it can be readily understood why there is no expansion of the wheat acreage this year. Eastern Canada markets much of her output in the Northwest provinces and is manifesting an attitude of uncertainty as to the probable outcome of the stringency.

Have Canada's resources been diminished or depleted? Not in the least. The same wheat areas are there deep and fertile, herds of cattle range the prairies and untold wealth lies buried in the hills. We yet have great measures of coal and iron and vast uncut forest. The cities of Canada have still the great additions they have made to their wealth in the form of civic undertakings and conveniences. The large manufacturing concerns with their buildings and equipment and trade organization and facilities have still that which industry and intelligence have gathered. Inexhaustible power in the rivers and streams of this country lies at our door. Land speculation is not the source of a nation's wealth; the excessive investment in land has helped to make money tight. This flurry will only cause land prices to be placed more nearly on their actual values.

What is needed is cheaper money for the farmer in Western Canada and reasonable patience before the withdrawal of support from the smaller manufacturer. What is needed above all is an exercise of that confidence expressed by Sir Edmund Walker, when he said in regard to the present situation, "There is bound to be considerable stringency in the autumn and it won't be so easy to finance the crop-moving operations this year as during the past few years. But I do not anticipate anything serious."

These are the times that test the strength of men. These are the days demanding calm thought and deliberate judgment and a broad, statesmanlike grasp of the commercial situation. Carefulness in word and deed and absolute refusal to be stampeded by mere alarmist reports, may not only save the situation, but also serve to put our commerce on the firm basis that provides regular and conservative expansion.

The Air Compressor in the Furniture Factory

Written by W. J. Beattie for the Canadian Woodworker

The air compressor used to run the rubbing machines in a furniture factory can be utilized for other useful purposes: This is what is done in a factory that has one of these compressors installed. The factory is driven by electric motors, and everyone knows that if you want efficient service from a motor you must keep it clean, and the difficulty of doing so in a woodworking factory is considerable, no matter how well piped the machines may be.

The ordinary hand bellows that is sometimes used for this purpose is not capable of blowing off the fine dust that is drawn into the motor, the speed of which packs the dust very solidly into the corners and out of the way places in the interior. It being impossible to get at them with a brush or duster, a half inch pipe was attached to the compressor and run along the ceiling so as to be convenient to run branches from it to the motors. These branches were each fitted with an ordinary valve near the end, onto which was attached about eight feet of small hose fitted with a long slender nozzle, with the opening about the size of an ordinary lead pencil. The compressor is run at ninety pounds pressure and the way the dust was hustled out of those motors was a sight. By doing this a couple of times a week they were kept as clean as the day they were installed, and as the quantity of dust that accumulated was small no one was inconvenienced by its disturbance.

This installation gave birth to another idea, namely, to clean all the machinery, shafting, walls, ceilings, etc., by the same process, which was done by tapping the same pipe at convenient places and attaching a good strong 3/8th inch garden hose of sufficient length that it could be moved from one branch to another. This hose was fitted with a long metal nozzle about two feet long, having an opening not over 1/4 inch. This will blow off the dust that settles on the walls, ceilings and pipes of a factory, digging it out of every cranny and crevice most effectually. For the cleaning of machines it is simply great. It will peel off the accumulated oil and dust as clean as a whistle, and it is possible to get at places that you can not reach in any other way.

The compressor being motor driven, it is easily used when the factory is not in operation, at noons, or on Saturday afternoons. It does, of course, kick up considerable dust if the factory has been allowed to get dusty, but by opening the windows the trouble is lessened. Afterwards by doing this frequently enough the trouble from that source is of no consequence. In a certain factory where this system is adopted a fire insurance inspector who had been in hundreds of furniture factories in the United States and Canada, remarked, "The cleanest I have ever seen."

The exhaust fan in the same plant is also electrically driven, which makes it possible to do a complete job of cleaning independently during the noon hours, evenings or Saturday afternoons, which is a consideration.

This factory, though it has been running for years, looks as if it had just been in operation a few weeks, everything looks so bright and clean.

Perhaps the foregoing will prompt some manufacturer who takes pride in the inside appearance of his plant to utilize his air compressor to get after the common enemy—dust.

Electric Motors in Woodworking Plant

The June issue of the Canadian Woodworker, under the above heading, contained a brief description of the installation and operating costs in a couple of woodworking plants. We give below some interesting data in connection with the Raudenbush Piano Company, of St. Paul, for which we are indebted to the Commercial Section of the National Electric Light Association. This piano company has an installation of 14 motors, totalling 45¼ h.p. The number of running hours per week is 54 and the type of installation is the combination, that is, some of the motors drive only one machine and others drive more than one, as indicated below.

The current consumption for the twelve months of the year 1911 is given as follows in kilowatt hours: —January, 671; February, 1,026; March, 1,198; April, 1,337; May, 1,239; June, 1,379; July, 1,003; August, 1,772; September, 1,737; October, 1,968; November, 1,114; December, 1,098; giving an average monthly consumption of 1,295 kilowatt hours. At a 1c. rate the power cost per month is, therefore, only $12.95. The average load factor for the year worked out at 5.25 per cent., that is only 5¼ per cent. of the 45¼ h.p. were operating, on the average, all the time.

The motor installation in this factory with the particular machines operated by each are given in the following list. All motors are 2-phase, 60-cycle, 220 volt, 1,800 r.p.m..:—

One 3 h.p. motor coupled to shaft drives two spindle shapers;

One 5 h.p. motor drives one frieght;

One 5 h.p. motor drives one 8 in. inside moulder;

One 5 h.p. motor coupled to shaft drives one automatic knife grinder, one emery wheel, one small drill press;

One 3 h.p. motor belted to one 24 in. hand jointer;

One 3 h.p. motor belted to one 16 in. rip saw;

One 5 h.p. motor belted to shaft driving one 16 in. drum, one sander and Mattison pillar turning machine;

One 5 h.p. motor belted to one 24 in. blower;

One ¼ h.p. motor belted to one glue spreader;

One 3 h.p. motor belted to one belt sander;

One 1 h.p. motor belted to one horizontal arm drill;

One 2 h.p. motor belted to one 6 in. rip saw;

One 2 h.p. motor belted to one 16 in. cut-off saw;

One 1 h.p. motor belted to one band saw.

The man who wins today is the man that has the sunshine of success in his soul—the man that has the true ring of a result-getter—the tireless, always-willing-to-work chap that knows darkness is the messenger of the coming day—he who lets your little failings fade into the shadow of charity—the man that syndicates sunlight and sends the whole blamed organization on to success.

If man were just as full of new ideas as he is of perversity, there would be some improvements made every day. Still, we get along very well as it is.

Problem of Lumber, Veneer and Panels

Dimension Stock Should be Standardized—Price and Cost—Better Work and Freight Saved—Economy in Manufacture

THERE comes a time, now and then, in the furniture, lumber and veneer industry when the problem of supply is a very trying one. When the furniture factory is busy and full of rush orders, the millman has more calls for lumber than he can supply, and the panel man gets behind with his orders and cannot give that quick service which is pleasing to both him and his customers. When the price of lumber goes up, the furniture man turns to making more of his own panels as a measure of relief, and there is turmoil and tribulation all along the line, says the Furniture Manufacturer and Artisan.

More effort should be made to standardize dimension stock at the lumber end. It would give the mill man a chance to refine a lot of lumber at the mill, to use some that he perhaps has to throw in the waste pile, and to supply more real furniture material with fewer carloads. Take the posts and other framing for bedroom furniture. Much of this could be covered with short lengths if not with specific dimensions. Here will be a man cutting thick plank of varying standard lengths into bedstead posts. They, perhaps, differ considerably in pattern even in his own factory, and more between his factory and some other factory, but they are all short as to length, and the whole list could be pretty well covered by the furniture manufacturers adopting a few standard short lengths for this work. The same idea could be carried out more extensively in various lines of work. More could be done in the way of specific stock if manufacturers would get together on this subject in the right spirit.

That is what the wagon and vehicle people had to do some years ago—get together and establish standard sizes and specifications on as much stock as possible. This was done to facilitate getting out stock at the mill in advance, and to make it practical for mill men to cut and carry stock in advance of needs in such sizes as would fit the market anywhere. Before that time there had been a disposition for every fellow to go it alone, and to have his work differ in many respects. This kind of confusion was found to be working an unnecessary hardship on both the makers and the users of material. The result was a pretty comprehensive and thorough list of standard sizes in wagon and vehicle dimension stock.

Furniture making is subject to more variations and changes than wagon and vehicle work, but just the same there is room to do some good work along this same line, first in specific dimensions, and then in the matter of short lengths for any number of purposes. The short lengths might include veneer as well as lumber dimensions, and help out some with the veneer supply, too.

In a furniture factory visited by the writer recently where there was a great rush on to fill orders, and lots of panels of many different sizes being used, the manager said that they used to buy their panels but had now taken to making all of them. When asked for the reasons that led to the change, he said that it was not that he could make them cheaper or better than the panel man, but a matter of service. He found that at just such times as he had a great rush on, it was very difficult to get prompt action from the panel men, consequently his work would be delayed and his customers howling, so he put in his own panel plant and quit buying from the outside.

Another factor not yet mentioned is that of price and cost. Lumber prices have been going up steadily for some time, with veneer and panels naturally following. Standardizing and increasing the amount of raw material that can be bought in specified dimensions and short lengths should help ease the cost all along the line. It would give the mill man a chance to work up his timber better, and there would be a saving in freight. In panels the same would hold to an extent, and it should make for economy in manufacture, too.

Opportunities for Trade

Any concern interested in the following should write the Department of Trade and Commerce, Ottawa, giving the number of the item.

624. **Veneer**—A Liverpool firm seeks supplies of Canadian three-ply veneer and boards, and invites offers from Canadian manufacturers of same.

628. **Furniture**—A Newfoundland firm desires correspondence with a Canadian manufacturer of furniture.

585. **Barrels**—A firm in Hull, England, with agents in New York, desires to obtain the names of makers of hardwood flour barrels, to import same in the stave.

Great Art Exhibit

The display of paintings at the Canadian National Exhibition draws lovers of the beautiful from all parts of America. In the galleries are gathered the best works of Canadian and United States artists, and the great galleries of Europe loan their treasures to further enhance the value of the collection.

This year the galleries will be divided into four sections; British, German, United States and Canadian, and the entire exhibit promises a distinct advance on the previous great collections that have featured the Canadian National.

Working because it is right to work—working to make the best of one's self—working because unfoldment of self means good to all surrounding, are the true incentives to enable man to accomplish purpose and to unfold godship within. Always there is work to do. Reward for doing what one ought to do is a fallacy of the past.

Keep the nuts screwed up tightly, but never screw them tighter than necessary to accomplish the desired result. Cultivate the sense of feel in this matter. It is the only guide. The setting of a nut calls for a nicety of discretion which can be arrived at only by practice and observation, and which can never be imparted.

Insurance inspectors are unwelcome visitors generally, and yet their suggestions and requirements are generally good for the institution.

Waterloo As a Furniture Centre

Several Important Factories Located at This Point, Including One of the Many Branches of the Canada Furniture Manufacturers—Particulars of Equipment and Processes of Manufacture—Expensive Lumber Used

Mahogany table, Louis XV design.

THE little town of Waterloo, Ont., is one of the busiest centers of its size in Canada. With a population of some 5,000, it has many large and up-to-date factories of various kinds, for which the town is admirably situated, being on the main line of the Grand Trunk Railway. The wide-awake citizens of Waterloo are represented by a municipal council composed of intelligent business men who are ever ready to afford facilities to enable reliable manufacturing concerns to establish themselves there. In this article, however, we shall deal with some of the furniture and woodworking industries.

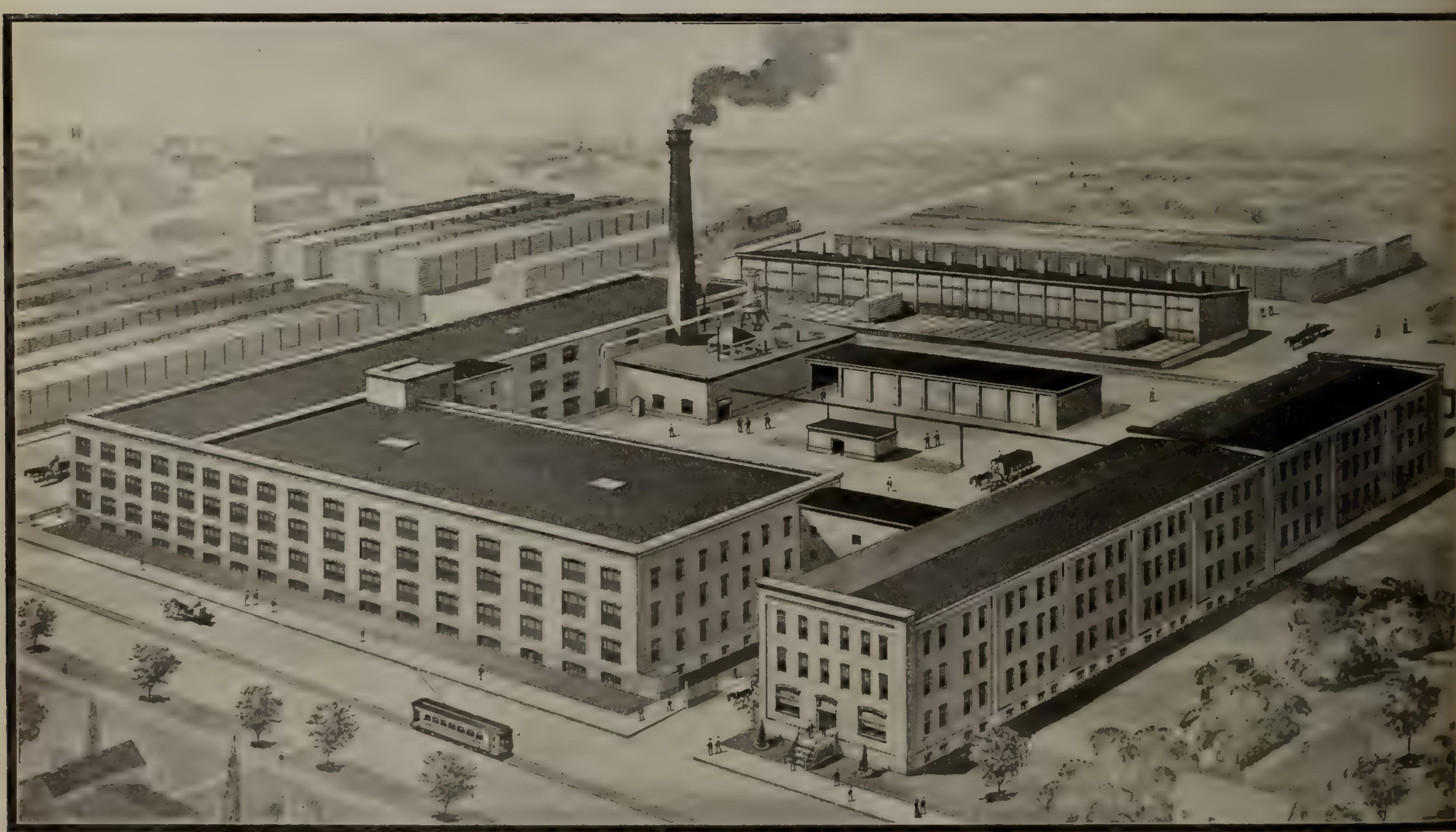
The Canada Furniture Manufacturers

The fine Waterloo plant of the Canada Furniture Manufacturers, Limited, is situated on the corner of King and Allan streets. The former is the main street of the town and eighty feet wide. Directly opposite the factory are fine private residences surrounded by well kept lawns. The roadway is kept in a fine condition and well watered in the summer time, all of which helps to make the factory a pleasant place for those employed. The lawns in front of the factory are well kept, adding considerable to the neat appearance of the plant.

The factory has a frontage on King street of 200 feet and 150 feet on Allan street. It is four storeys high, including basement, and 60 feet wide. The building, in which are the office, upholstering and shipping rooms, has a depth of 135 feet.

The building is of brick, mill construction, provided with extra heavy walls, plastered on the inside, having the necessary fire walls and fire doors, hardwood floors throughout and is heated by the vacuum system installed by the Illinois Engineering Company, of Toronto. Sanitary conditions are well looked after. Spitting on the floors or walls is forbidden, cuspidors being provided for all who require them either constantly or occasionally.

The lumber yard is well arranged and commodious, a railway switch running directly into it making the unloading of lumber as easy as possible. The lumber used is principally mahogany, 1 to 3 inches in thickness, from Honduras and Africa, quartered oak from Indiana and gum wood from the Southern States. The domestic lumber used includes birch, oak, ash, basswood and maple. Birch is used as thick as 4 inches. All lumber is well air seasoned before being



The Waterloo Factor of The Canada Furniture Manufacturers, Limited.

Interior Views of Waterloo Factory of The Canada Furniture Manufacturers, Limited

A Portion of the Varnishing Room.

A Corner of the Staining and Filling Room. Note the "Bowser" pumps in the lower right hand corner.

placed in the kiln. The dry kiln is equipped with ball bearing lumber trucks which carry 3,000 feet of lumber each. There is a lumber shed in connection with the kiln and of the same construction. The kiln building is directly opposite the factory door where the first operations begin.

The Equipment

The motive power is furnished by two boilers and a 100 h.p. Wheelock engine, which also drives a generator that furnishes artificial light to the factory and for the motor driven machines in the upholstering and shipping departments. The line shafting is 3-in. Chapman ball bearing. The machinery is of both Canadian and United States manufacture. Swing and rip saws were supplied by Cowan & Company, of Galt, the jointers and planers by the McGregor Gourlay Company, cabinet planer by the F. H. Clement Company, of Rochester, N.Y., the triple drum sander by the Milwaukee Sander Company, of Green Bay, Wisconsin. The latter machine is supported from the floor of the basement on brick and cement piers, which make a solid foundation and reduce vibration to nil.

Showing the manner in which goods are piled away in the storerooms, both in the white and finished.

The guage lathe supplied by Clement Company, of Rochester, N.Y., has a pit lined with galvanized iron directly under the knife, into which the shavings fall and are carried away by the exhaust fan, thus avoiding the accumulation on the floor which has to be cleared away very frequently. The mouth of the pit is not wide enough to interfere with the operator. The shavings, being heavy, drop perpendicularly and very few fall on the floor.

The shaper was made by Goldie & McCulloch, of Galt, and the band saws by Cowan & Company of the same place. The latter are filed by one of Boldwin, Tuttle & Bolton's machines. The veneer room equipment was furnished by Chas. E. Francis & Company, of Rushville, Ind; boring machines by the F. H. Clement Company; mitre saw by the Alex. Dodds Company, of Grand Rapids, Mich.; double cut-off saw by McGregor Gourlay Company; belt sanders by Wysong, Miles & Company, of Greensboro, N.C.; mortise machines by the F. H. Clement Company; jig saw by L. G. McKnight & Son, and the double 40-in. exhaust fan by Sheldons Limited, of Galt. The latter stands on a cement foundation and discharges into a concrete shaving vault in boiler room.

Part of the Upholstering Room.

All machines, such as rip saws, buzz planers and shapers, are provided with rubber mats on the floor, affording a secure footing for the operator. A hardwood floor becomes very smooth and unless covered at such places is dangerous, as a slip may mean a serious accident. The rubber mats are edged around with a bevelled moulding, nailed to the floor, making them thoroughly reliable and useful.

The Oil and Varnish Pumps

One feature of the equipment of this plant worthy of mention is the Bowser system of oil and varnish pumps, which work as follows: A fireproof building is situated in the centre of the factory yard in which a group of metal tanks have been constructed to hold the various materials. The barrel is rolled from the dray directly over the tank, the bung knocked in and

A corner of the Rubbing and Polishing Room.

the contents emptied into it. In the various departments of the factory are groups of pumps. Each pump is labelled with the name of the material it is especially fitted to handle. These are piped directly to the respective tanks in the store room, and, by means of

A portion of the Packing and Shipping Room.

stops, the exact quantity of material required can be drawn up to a gallon at a time; by simply turning a crank that lifts the plunger the quantity is automatically discharged. A figured dial records each unit quantity taken. There is a drip pan to catch surplus drops, which is really unnecessary if ordinary care be taken. This equipment saves a great deal of time and labor and the carrying of large quantities of inflammable material in the factory is avoided. A view of the pumps is shown.

The Finishing Room

The finishing room is equipped with all appliances to facilitate work, including a large mahogany stain dipping vat, also a good sized fireproof room fitted with shelving for the keeping of stain powders, chemicals, varnish pots, brushes, etc. This is the finishing

Mr. W. J. Beattie, Manager of the Waterloo factory of The Canada Furniture Manufacturers.

room laboratory, where all stains and colors are got ready and from which sample finishes and colors are sent to enquirers.

Mahogany is generally finished the standard color, but all oak goods have to be stored in the white and finished according to customers' wants. Golden oak is still the general favorite on average goods, but the fumed finish has many admirers in substantial furniture. It matches well with leather upholstering, producing a highly desirable article, both from the producer's and consumer's point of view. Early English finish is not so popular as a few years ago, but still it is frequently called for in large davenports, settees, rotunda chairs and club furniture.

All goods that are finished, as soon as the cabinet makers are through with them, are piled away (in the gloss) systematically, in store rooms, and as orders for them are received they are taken to the rubbers and polishers and then to the upholsterers, although after leaving the upholsterers they are gone over again for a final inspection before going to the shipping room.

The rubbers work on large low tables about seven or eight feet square, having a 3-in. rim around the

Three piece Parlor Suite made by the Canada Furniture Manufacturers.

edge. The top is covered with galvanized iron and dips slightly from each side towards the centre, from which runs a pipe to carry away the water and pumice stone used in rubbing, and the sponging with water that the article gets in cleaning off all traces of pumice stone that get into the corners or around the carving. These tables are necessarily stationary. A frame that is to be upholstered, no matter how fine in design, is incomplete until a man makes a pocket for tacks of his mouth and wields a slender long nosed hammer in his hand. This man is often an artist, which you would be bound to admit if you saw some of the fine work turned out in this department. Color

harmony between the wood and textile industries is the desired end and is accomplished here.

Upholstering Department

There is a large staff of upholsterers constantly employed. The covers for the frames are cut from patterns kept for each individual article and are ready for the workmen when required. All sewing for this department is done on machines driven by electric motor. All material used, such as curled hair, tow, etc., is run through picker machines to insure its proper preparation for the work. These also have their individual motor drives.

The steel springs used are the best procurable, being mostly imported. The outer textile coverings are imported from Halifax, Eng., and Philadelphia, Pa. Morroco leather covering is imported from England. Spanish and other kinds are of home manufacture, a great deal of which comes from Marlatt and Armstrong of Oakville, Ont.

Finishing

All goods that are finished fumed are done by the box fuming process—that is—the goods in the white are placed in an air-tight chamber and are subjected to the fumes from liquid ammonia for about four and a half hours, this penetrates the surface to a considerable depth and gives the true fumed color, any variations in shade between two pieces of material in an article, after it comes from the fuming box, are properly blended by a man skilled in the work, using a specially prepared chemical, resulting in a fine evenly toned piece of furniture. The liquid ammonia is held in a tank placed on a shelf five or six feet from the floor, outside the fuming box, into which it drips through a small pipe and thence down a zig-zag open trough, (like the section of a stairway) travelling about eight feet, during which time it evaporates and fumes the enclosed furniture. Any that reaches the end of the journey drops into a tank of water placed there for that purpose. The fuming box is fitted with a large ventilating pipe running up through the roof, this is provided with a damper which is kept closed during the process, after which it is opened and the fumes drawn off, this has to be done before it would be possible to enter.

Packing and Shipping

The packing and shipping room is equipped with the necessary motor driven machinery for cutting, crating, etc. When new goods are packed for the first time the size of the material for the crate is taken off on a stock bill, the cubic feet of space required and the weight of the article. All this information is necessary for shipping advice for customers, in car lots, or mixed car lots in conjunction with other goods from this firm's factories.

The careful and efficient packing and shipping of furniture is one of the hardest propositions manufacturers have to deal with. Between the careless handling by railroad employees and the "unpackers" of a number of dealers, there is always "something doing" in adjustments, but as time goes on, by using every care, these worries are being reduced considerably. The goods manufactured by this factory consist of fancy room furniture, bedroom chairs and club furniture in Classic, Period and Modern designs,

Factory of the Globe Furniture Company, Waterloo, Ont.

which have an enviable reputation from the Atlantic to the Pacific.

The manager of the Waterloo factory of the Canada Furniture Manufacturers is Mr. W. J. Beattie.

The Globe Furniture Company

The Globe Furniture Company, Limited, was launched in Walkerville, Ont., twenty-four years ago, and ever since that time has occupied a foremost position in the manufacture of fine church furniture of every description, their pews and other church furnishings being used in every part of the Dominion from Halifax to Vancouver.

Their plant, with the new addition as shown in the illustration, will have a floor space of 72,000 square feet, with a gross business capacity of $500,000 annually. The annual consumption of lumber at this factory is 500,000 feet of 1-inch maple and birch, 300,000 feet of ash, 300,000 feet of elm and 200,000 feet of white oak, both quarter and plain. They also consume a considerable amount of veneers of all kinds, including mahogany, Circassian walnut, quartered oak, and birch, for interior trim and special work. Also rotary cut birch veneers for chair purposes. The firm carries in their yards and sheds at all times from 500,000 to 700,000 feet of lumber of all kinds, their object in doing so being to season it thoroughly before putting it through their drying system, thereby insuring the best quality of lumber obtainable for their products.

Roman Catholic Altar, made by the Globe Furniture Company.

The kilns, which are of the most up-to-date type, have a capacity of 100,000 feet, with a daily drying capacity of 5,000 feet. Besides these, the company has dry-sheds for the purpose of storing the lumber when it comes out of the dry kiln. This puts it in condition with the natural atmosphere so as to reduce expansion and contraction to the minimum. The company have installed the latest and most improved machinery so as to keep pace with the progress of the trade in Canada and the rest of the world, for they do not make exclusively for Canadian consumption, doing a considerable export business, especially to South Africa and Newfoundland.

School desks, made by The Globe Furniture Company.

High Pulpit, made by The Globe Furniture Company.

Besides church furnishings they make school furniture, including their well-known Model school desks,

and the New Globe Automatic, an excellent line of sanitary school furniture. The cabinet department, in which bank fittings, fine office and interior house fittings are built, has from the beginning been a factor in the steady development of the firm's business, the same high standard of workmanship characterizing this department as the others.

The accompanying illustrations show some of the work produced in this modern establishment. The sanitary steel school desks and recitation seating, together with the extensive line of church furniture, make up the large bulk of the firm's business, although a large force of men are constantly emlpoyed in the theatre seating department, and many of the beautiful theatres and opera houses throughout Canada are equipped with opera chairs produced by this company.

The Waterloo Furniture Company

The Waterloo Furniture Company, Limited, occupy a large three-storey white brick building with basement. Their spacious offices are luxuriously fitted out for the convenience of the visitor. Everything in connection with their plant is thoroughly modern and they have just installed a new sprinkler system. In the basement the frames in white are kept. On the first floor is the upholstering department, which is well lighted, having many large windows. The shipping room also is on this floor and is placed in a very convenient situation. The second floor is the finishing room and display room, the furniture in the latter being tastefully and artistically arranged so as to show it to the best advantage to the prospective buyer. Suites are shown in solid mahogany in different period designs and choice silk upholstering. On the top floor the finished frames are stored and system is here displayed, making it an easy matter to locate any article of furniture required. A large elevator is conveniently placed in the center of the building. Mr. E. O. Ueber is the president and Mr. C. F. Ott the general manager of this company.

A Simple System of Figuring Costs

An Experienced Woodworker and Manufacturer Works Out an Easy and Accurate Method of Cost Accounting—Has Been Tried and Proved

Our business is without a doubt the most complicated in the woodworking lines on account of the varied work we make, says Mr. Chas. F. Kade, an experienced manufacturer of fixtures and interior trim, in The Furniture Manufacturer and Artisan.

First—We use so many different materials (lumber of dozens of varieties), glue, nails, screws, sandpaper, etc.; hardware specialties of almost an unlimited variety, marbles of all kinds, tiles and mosaics, inlaid decorations, etc. Finishing material of all kinds; glass, mirrors, art glass, electric light fixtures, decorative paintings, etc., etc. In fact, a great deal of nearly everything, all of which has a tendency to make the figuring of "costs" very complicative.

Second—Some of our work requires about 95 per cent. labor and lumber and some of it may require 95 per cent. of materials we buy and only 5 per cent. labor, and in between the two extremes it varies to almost any percentage. This also has a tendency to complicate the cost of figuring.

Third—The different woods and finishes also make it more complicated, as one wood may cost less in price but may cost more to work, likewise one color of finish may cost less for materials but more to put on and longer time to dry.

My idea of figuring cost is a system that will automatically regulate itself, no matter what percentage of labor or material is used, whether made in your own plant or bought from some specialty manufacturer, and if you will follow me, I will endeavor to make it plain to you, and if you will adopt it, you cannot go wrong.

Some manufacturers have used the method of figuring lumber and labor only, then adding a certain percentage for overhead. Others have tried to divide the percentage of overhead by figuring, say, 20 per cent. on show cases and 40 per cent. on fixtures. Some have figured lumber, labor, glass and all other material and then added a uniform overhead percentage. Some have done the same thing but figured different percentages according to the class of goods and most of them have never figured enough for overhead expenses, and those that have, seldom ever found their method satisfactory, and I believe all will agree that it has been guess work with all of us, for the overhead expenses always vary in accordance with the amount of business done.

Here is my opinion:

Article 1st.—Pay Roll

Divide your pay roll in three classes.

A—All productive help, such as machine hands, cabinet-makers, finishers, fitters and packers.

B—All non-productive help, such as engineers, foremen, detailers, stock billers, watchmen, yardsmen, teamsters, elevator men and all help around the factory whose time is general time and used in the manufacturing end of the business; in other words, whose time you pay for and it is impossible to charge to any one particular job.

C—All office help, such as officers, salesmen, designers, bookkeepers, stenographers, etc.; in other words, all help that you pay who are non-productive in the official end of the business.

Thus you have your pay roll divided into three accounts, as follows:

A—Productive labor at manufacturing end.

B—Non-productive labor at manufacturing end.

C—Non-productive official help at the office end.

Article 2nd.—Business Expense

Ascertain your entire expense of doing business outside of the three pay roll accounts which should include the following:

A—If you own your own property and buildings, do not figure any rent; if you pay rent, include rent.

B—Figure in at least 6 per cent. on amount of money invested, as that is about what you have to pay at the bank when you borrow it.

C—Figure all insurance, such as fire, liability and co-partnership insurance.

D—Figure all advertising, such as trade journals, calendars, souvenirs, etc.

E—Figure all catalogs, circulars, stationery, post-

age, telegrams, electrotypes, photos, etc., pro ratio as you use it each year.

F—Figure all travelling expenses, whether for association meetings, other business or for selling goods, but not for installing goods.

H—Figure all barn expenses, such as feed for horses, or gasoline, oils, etc., for auto trucks; also all repair expenses for wagons, trucks, etc.

I—Figure all repair expenses on machinery, tools, buildings, etc., and on account of same, do not figure any depreciation on same.

K—Figure all glue, nails, screws, sandpaper and machine oils, etc., used, into the expense account.

L—Figure all brushes, such as glue brushes, paint and varnish brushes, into your expense account, as you cannot charge same to the cost of any one particular job.

M—Figure all taxes, commercial reports, such as Bradstreet's and Dun's, etc.; also yearly subscriptions of any kind, donations, etc., to public enterprises, etc.

N—Figure all fuel, light, gas, telephones, etc.

O—All miscellaneous items that do not get charged against any one job. Freight and express charges should be charged against each job in the cost of same.

Q—Figure also all interest paid and discounts and commissions (if you pay any) allowed.

Article 3rd.—Material

All materials should be figured at actual net cost laid down at your plant ready for use. Lumber should be figured about $7 per M. higher than actual cost. For kiln-drying, piling, etc., but instead of adding a percentage for waste, it should be figured according to the actual net amount used up after being scaled according to board measure by your cutter as he cuts it. Adding a percentage for waste is only guess work and varies from 2 per cent. to perhaps 50 per cent., according to the grade of lumber used, and what it is used for. Hardware, marble, glass, varnish, etc., should all be figured at actual net first cost, adding freight, etc.

Thus You Will Have

A productive labor account at factory end.
A non-productive labor account at factory end.
A non-productive official account at office.
A business expense account.
A material account.

Now how are you to get a safe basis to build your cost system on? Very simple, i.e., take the productive labor account as your foundation. This you can do very easily for it is merely a matter of figuring first your total amount of productive labor account; second, your total of non-productive labor account; third, your total of non-productive official account; fourth, your total of your business expense account, and ascertain how they average with the productive labor account and you will have the only safe basis to work upon, and the material account will take care of itself. As an example, let us say you find upon figuring it up that it averages as follows:

Non-productive labor account at factory end equalled (see article 1st, B) one-fourth as much as productive labor account at factory end, or 25 per cent.

Non-productive official help account at office end equalled one-eighth (see article 1st, C) as much as the productive labor account at factory end, or 12½ per cent.

Business expense account equalled (see article 2nd) three-eighths as much as the productive labor account at the factory end, or 37½ per cent.

Thus you have to add to the productive labor account at factory end as follows:

25 per cent. for non-productive at factory.
12½ per cent. for non-productive at office.
37½ per cent. for business expense,
all to productive labor account only.

Let us take an imaginary job like this:

Now in the above you will notice you have the cost of handling your lumber, running your plant, and your labor, as well as your business expenses, which is all figured in the different percentages above added.

Selling Expense

Now about selling expense. That depends on what your selling expenses amount to and here is where that should be added; however, it varies on nearly every order you take. Kindly note item under article 2nd and you will find that same includes general expenses which should, however, be considered mainly to cover such as general advertising, travelling, etc.

Make your terms strictly net 30 days, 2 per cent. for cash in ten days from date of invoice, or 5 per cent. for cash with the order, and do not violate these terms for millionaire or poor man and if the job is special work of an amount of $500 or over, demand a deposit of at least 50 per cent. the same as a tailor does on a special suit of clothes or a building contractor does on a house.

Now this system may seem queer to you at first, but if you will study it over carefully, I believe you will find it nearer fair than any other (though it is, no doubt, subject to improvement); for no matter what amount of labor or material any one job contains, the "overhead" expense "is pro ratio alike," it being added to the productive labor account only and the selling expense and profit to labor and material alike.

I am no expert accountant, only one of those blamed fool, mislead fixture makers, therefore I feel that while the "basic principle" of this system may be right, some expert accountant could, no doubt, do much to simplify it. I will further state that a "uniform sheet" of figuring cost would be a very simple matter for this system.

Ascertaining Overhead

The main problem will be to ascertain the proportionate percentage of your overhead expense (which should be, as before mentioned, the non-productive pay roll at office, and the business expense account added and divided by your productive pay roll) so as to get the right amount to add for overhead in the first place (on the amount of productive labor paid for) instead of in the last place.

This way you will, no doubt, find that instead of adding 20 per cent. to show cases and 40 per cent. to fixtures, that you will have to add anywhere from 50 to 100 per cent. or even more to all. But it will surprise you how it will equalize the pro ratio of overhead expense, each job having to stand its fair proportion instead of one job standing a whole lot and another job hardly any.

I claim that each job should stand the same proportionate overhead added to the productive labor only and thus you will get the same percentage of profit on all.

As it is and as it has been, we have all been figuring some of our goods too low and others too high, and mainly by "guess work," or been governed by prices of our competitors entirely. Result, our cost books have been costly books and we have been apparently making a profit on all things (in our cost book) but not in our bank book. If you will sift it down and make each

job stand its proper proportionate overhead expense, you will find that we have been really losing big money on many articles we make and charging too much on many articles that we did not sell many of because our prices were too high.

Figure it out for yourself and you will find that if each and every job bears its proper proportion of the "overhead expense," you will be able to reduce your prices on some goods and you will have to raise them on some goods.

By this system one thing is sure: If you add enough for overhead expense on your productive labor account to cover your overhead expense of doing business and running your plant, you will know exactly just what you make on your materials that you sell. You will then also be making the same percentage of profit on the labor that you sell and you will know that you are not losing money on one thing and making it up on the other.

On Long-drawn-out Jobs

A job that is in your shop six months will also then be standing more of the overhead than one that is there only thirty days, which is only right, for the longer your productive help works on a job, the more overhead it should stand.

Another thing: A job that requires only little labor and mostly all material (meaning lumber, glass, marble, metal work, etc.), will be on an equal basis with the job that is nearly all labor and no material, as far as standing its proper proportion of overhead expense is concerned, and your margin of profit.

The margin of profit can always be varied after you have your actual cost of your goods (at your shipping room door) according to what class of work it is. I claim that on special work the margin of profit should be larger than on stock goods.

Thus you can be sure of your actual cost and add a large margin of profit for a complicated job, or a closer margin of profit for a desirable job.

The percentage of overhead expenses will, of course, vary in every factory. I do not believe that there will be two in the whole country that will find their percentages exactly the same. But on cost of glass, lumber and other materials, also productive labor, we cannot vary greatly as we all pay about the same. Thus the manufacturer with the smallest percentage of overhead expenses, compared with the number of hours of productive help put in, will have the advantage and the one that sells his goods at the smallest margin will be the biggest chump after he knows exactly what his goods cost him.

In Summing Up

Summing it up it is simply a method of basing your overhead expenses on your productive pay roll and adding your material, selling expenses and margin of profit afterwards. Therefore, the more time a job takes, the more of the overhead expense it has to carry (regardless of materials used); the less time it takes, the less overhead expense it has to carry. The better the business, the lower the overhead proportionately. The duller the business, the higher the overhead proportionately, and it can be got down to a monthly basis by proper bookkeeping methods.

Try it out, you get your overhead in the productive labor and you get your profit on the labor and material. Prices will equalize themselves properly and you will get the same margin of profit on all instead of a big profit on some things and no profit on others.

I have studied cost system for years and while this article is quite lengthy, this system is very simple and comes nearer being a fair method than any I know of; in fact, it is something like the contractor, or carpenter, or machinist who does day work for you. He pays his man, we will say, 30 cents per hour. To this he adds 30 cents per hour and charges you 60 cents. Then for his material he adds a fair profit and charges you accordingly.

If this system is adopted most of us will find that we will have to add about 75 to 100 per cent. to the cost of our productive labor account, but that that will about equalize what we have been adding in other ways to material, labor, etc., and that this system will equalize the overhead properly.

I can illustrate it to you by your own cost books (if you have any). All you need do is take two jobs—one with nearly all glass, marble, hardware, etc., and very little labor, and the other with nearly all lumber and labor, and figure them both, one your old way and one according to the new system. Then figure both of them both ways, and it will illustrate the difference.

Inside Details

In the manufacture of furniture much more attention is given nowadays to inside details than ever before. Perhaps we have not reached the point of giving the same elaborate attention to the inside of furniture as was given in the older countries in the days of secret drawers and mysterious interiors of various kinds, but that there is much more attention given to the inside of work than formerly is a fact easily established by the examination of an assortment of furniture shown in any first-class store.

Take the inside of drawers of dressers, chiffoniers, sideboards, buffets, for example, and there has been much improvement of late years, so much, in fact, that in some instances it seems as if little more could be asked for. Not only are the drawer bottoms made of three-ply stock, so that they are substantial and neat, but the bottoms and sides receive a protecting coat of finishing material and at times the trouble and expense is gone to of making the drawer bottoms of the same material as the face wood on the furniture. Thus we see now and then furniture faced with mahogany veneer and the drawer bottoms likewise faced with mahogany veneer. Of course, it is not the same grade veneer as is used on the front, being perhaps, scraps and cull stock, but it is the same kind of wood and shows a thoughtfulness and care that is perhaps more generally appreciated by furniture buyers than some manufacturers have come to realize.

So far as really high-grade furniture is concerned, it is possible that we are just getting well started into an era of more attention to inside details and that the future will see quite a lot of special attention concentrated on this feature. There are certain people with plenty of money to whom the price is a minor factor in deciding the selection of furniture; it is likewise known that people of this class are strongly influenced by the inside details as well as the outside appearance of a piece of furniture. Perhaps the one weak spot in this knowledge is the assumption on the part of the average manufacturer that the buyers of this kind are limited in number. This is perhaps true of certain buyers of what might be termed the ultra class, but the thing that counts here and perhaps counts bigger than the furniture manufacturers have yet appreciated, is that there are many thousands of people in the country to-day who use taste and judgment.

Useful Hints for the Woodworker

Trade Problems Solved—Time and Money-Saving Hints —Care of Tools and Many Valuable Ideas

Keeping Files and Rasps Clean

Sometimes the workman has to file babbitt or rasp wood and when so doing there is ever the nuisance of the chips sticking into the tooth spaces and clogging the tool. Chalking the file is a good way to avoid this trouble as chips will not hang on to a tool treated this way. Another plan is to lubricate the file with water and also to wet the article being filed. Boiling water will free the rasp from wood but not from babbitt filings. Water should be used before starting to file any soft and clinging metals such as babbitt.

* * *

Giving White Wood a Black Walnut Finish

To obtain a black walnut finish on white wood add one pound of dry burnt umber, one pound of burnt sienna, and four ounces of dry lampblack, to one gallon of shellac. First mix the pigments together by dissolving them. Use very thin shellac. Apply one coat and when dry smooth with fine sandpaper, afterwards apply one coat of shellac, or varnish as may be desired. Umber alone, or in connection with burnt sienna gives a good walnut color, VanDyke brown gives a black walnut. These pigments are the most convenient for ordinary staining, and may be mixed either with water or oil.

* * *

Cutting Out the Fan Belt

One specific case of the advantage of eliminating belts and making direct connected motor drives, has been furnished by an engineer in charge of a woodworking plant where at first the fan was driven from a motor with a double 12-inch belt. The belt kept coming off, giving trouble and wearing out, until finally in investigating to see just what was the matter, it was discovered that a little over 100 horse power was being put on to this 12-inch belt. After having replaced it several times, and being hampered and interrupted in the factory by the shut-downs for this belt, it was decided to make the motor connection direct to the fan only eliminated, but the amount of power required for the fan drive was reduced over 25 per cent. This is a saving that is certainly worth while.

* * *

Destroying Wood Worms

The following are some cheap preventative measures of dealing with wood worms, wood ticks, etc., which attack and, if unchecked, destroy the wood. In the case of furniture and smaller pieces of joinery, and so forth, some success can be reached by pouring turpentine, benzine, petroleum or alcohol into the boreholes from time to time and then closing them with putty, provided the worms have attacked only small areas. These liquids are, of course, out of the question for larger constructions, as we have in roof timbers and truss work, on account of their inflammable nature. Here we need some agent which is cheap, is fireproof, and at the same time will bring death to the organisms by penetrating deep into the wood fiber. Tests have been made successfully by sprinkling the wood with boiling hot soap lye, mixed with salt water. If this is followed by closing the holes with a mixture of glue and putty, the worms will be effectively killed, as their air supply is cut off, even if they should have escaped the soap lye. In place of the lye, carbolineum can be used, provided there is no objection to the odor. Better, and just as cheap, is the method which coats the wood with a calcium or lime sulphate solution or with sulphuric acid, repeating this process several times. These liquids penetrate deeply into the wood, kill the organisms, and are easily applied. The only drawback, that of fuming during application, can be guarded against without much difficulty. The liquids evaporate rapidly, so that there is no danger of molesting the people in the house with the odor for any length of time.

* * *

Changing Fumed Oak to Early English

To change fumed oak into early English you should proceed along these lines. After removing all the finish, sponge with chloride of lime solution. To make this solution add one pound of ordinary chloride of lime to a gallon of water. Coat the wood, raise the grain thoroughly and sand off when dry. Afterwards apply a water stain of early English, but increase the proportion of black, that is, prepare the stain in the regular manner and add from one to four ounces of nigrosine to it and then lengthen it out with water to get it down to the shade you require. A very thin coat of shellac should be given to the work, which should then be sanded if any of the fibers stick through. It should then be finished in the regular manner.

* * *

A Table Receptacle

In cases where rooms are used for the double purpose of sitting and dining rooms, a large and useful space may be provided by fixing a sheet of three-ply wood beneath the table rails, and hinging the top to one of the side rails of the table. It is an advantage to use thin wood, such as three-ply, so that it will not be in the way when anybody is sitting at the table. It must be cut away at the four corners to fit against the table legs, and be fixed to the rails with small round-headed screws. In hinging the top, the larger the butt hinges are the better, as then the opening and closing of the top will not disturb the hinges. If the top is a big one, chains or cords may be fixed to prevent strain when the top is in vertical position.

With most tables the rails stand inward from the outer faces of the legs, and to allow for hinging, strips of 1¼ inch stuff are fixed with screws to the rails, the edge being in a line with the face of the leg. The shingles need not be let into the under face of the top in order to give full thickness of wood for screws; but they may be sunk almost the full thickness into the rails.

The Science of Saw-Fitting and Common Sense Treatment

IN the last three or four years a great many articles have appeared in the various wood working journals on the subject of the band resaw; how it should be fitted to produce the best results under the various conditions in which it is run, etc. These articles have been written, for the most part by men who are acknowledged authorities on the subject, and by a good many who are past masters in the art of saw filing. But up to the present time I have not seen a single article, on what to my mind, is the most important problem in the successful handling of resaw blades, viz; that of greatly prolonging the ordinary life of the blade, preventing cracks, and increasing the general efficiency of the saw, says Mr. C. D. Reynolds, in Berlin Quality. It is my purpose in this article, after years of careful thought and study of the subject, to tell how it is possible to do this.

The band resaw of the present day, manufactured by the leading saw makers of this country, is past the experimental stage; indeed, it is made for service, and I may say good hard service, and with proper care, use, and treatment will last without breaking or cracking, until worn down to a size when good judgment would demand its being replaced with one of proper width.

It is essential, however, in order to produce such desirable results, that the very nature of the steel itself, and the natural laws which control it, be made a matter of close study, and given due consideration, for any act not in accordance with these laws, will surely result in disaster. A good many operators and owners of resaw bands believe that because the saw is made from refined steel it ought to stand up under any and all conditions, and still produce satisfactory results. This is a highly erroneous idea, and should not be considered a moment. It is, I believe, the true reason for much of the trouble between the mill-owner and saw-maker.

It is true, the saw is made from the finest steel obtainable, but it possesses a nature so fine and delicate and sensitive that it will quickly resent any act of misuse or abuse, just as electricity will play havoc with the electrician the moment he digresses from the laws governing its forces. In nearly fifteen years of experience operating and fitting resaw blades I have never had a break or a crack in a single blade. I do not attribute this record wholly to good luck, for I am cutting all kinds of hard and soft wood every day from 4 in. to 24 in. width. I take exactly the same chances as any filer, but I was made to realize from the beginning that a saw must be put in the best possible condition, and receive the required amount of rest, in order that nature may readjust itself in the blade. My experience has confirmed the correctness of my first ideas.

By way of illustration, I would compare a resaw blade to an athlete about to enter a race. Before the event he puts himself in the pink of condition to stand the great strain he will be subjected to. At the finish of the race the blood (which is life) of the athlete is coursing through his system with lightning like rapidity, causing great heat and intense fatigue, and the only remedy on earth that will restore him to normal conditions is rest. How unutterably foolish, and how dismal his defeat would be, should he at once enter another race without resting.

It is precisely the same with the resaw blade, it is absolutely necessary that it be in the finest possible condition when it goes on the wheels. When you take into consideration that saws travel from 8,000 to 10,000 feet per minute under a strain from 1,800 to 2,400 lbs., besides the lateral strain of the cut, it is not to be wondered at that they "balk," when run under wrong conditions. It will be found on examination when a saw comes off the wheels after a two or three hour run, that there is a general disarrangement of the molecules of the steel (which is its life) and it takes plenty of time to restore natural conditions. It is absolute folly and nonsense for a filer to attempt to correct any defects in a blade the moment it comes off the wheels. A saw should never be rolled or hammered until it has been off the machine at least ten to fifteen hours.

The reason so many saws crack and will not do good work is that they are not given time to recover from the terrific strain they have been subjected to. The moment they come off the wheels the points of the teeth are sharpened and they go right back on again, and the filer and sawyer wonder what the trouble is and why the saws won't run as they should. Thousands of fine blades are ruined every year and consigned to the scrap heap before one-half inch of their width is used up, simply because the nature of the steel, and the natural laws which govern it, and the remedy which will restore it, are not known by the men who operate them.

No resaw blade should ever go on the wheels more than twice in any one week. If the machine runs steadily every day the saws should be changed every two and one-half hours, and enough saws provided so each one will take its regular turn. That is the way we do and we have not bought a single blade in six years nor are we likely to in the six to come. I know this statement will be very surprising to band saw operators in general, but it is true, nevertheless. It of course entails a large expense in the beginning, but in the long run it is infinitely cheaper, for the reason that saws will stand up to much faster feed and cut better lumber while the saving in saw bills and filer's trouble is enormous.

It necessarily follows that saws must be correctly fitted. A resaw should have all the tension it will take and still be flat on the leveling block. The tension should be from edge to edge, the back should be crowned 1/32 in, in five feet, there should positively be no sign of dish, which is the cause of "bullheading." The pitch of the teeth should be right for the kind of wood cut, 2½ in. in 6 in. is a fine rule for all kind of wood. The depth of gullets should be regulated by the gauge of the saw; 3/8 should be the limit in 20 gauge saws, 5/16 is better. The shorter you can run teeth in thin saws the better. Too much swage is a bad feature as it allows the dust to plaster against the sides of the stock, producing heat, which is at all times to be avoided.

An absolutely true back is positively necessary to the perfect running of a saw, as it is the most vital

part of the blade and is the most difficult feature to accomplish in the science of saw fitting. Years ago I discarded the old straight and back gauge, and now use an automatic back gauge of my own invention, which will instantly locate the most minute defect in either back or tooth edge if not more than 1-1000 in. in extent, and which would be impossible to see with the naked eye with the use of the ordinary straight or back gauge.

In the winter time all band blades should be kept in a warm place, for it must be borne in mind that the steel is refined and toughened in the fire.

Accidents in Woodworking Factories

In the twenty-fifth annual report of the Inspector of Factories for the province of Ontario, just published, the following statistics are given of accidents in the woodworking trade during the year and the machines which caused them:

Saws	36
Stickers	1
Mitreing machines	1
Sanders	4
Jointers	14
Rolls	1
Falls	6
Trimmers	1
Burns	1
Die press	1
Elevators and hoists	5
Veneering machines	1
Shapers	1
Shaftings	2
Planers	5
Moulding machines	1
Stamping press	2
Shears	2
Pulleys	1
Brush trimmers	1
Spindle carvers	1
Slash knives	1
Miscellaneous	3

Part of the report of Mr. A. W. Holmes, an Ontario Government factory inspector, contains the following remarks on machinery, which will prove of interest to our readers.

The machinery used in woodworking factories, on account of the high speed at which they operate, is easily among the most dangerous of all, but the last few years have seen great strides towards the protection of all these machines. The greatest difficulty the inspector has to contend with in these places is not the installing of guards, but getting the operator to use them. A few weeks ago I was in a woodworking factory to investigate an accident, where a man lost part of his finger. In talking to the foreman about how it happened, I learned that guards were provided for the machines but not used. The foreman said that he never saw the machine he would use a guard on. I replied "You are the man responsible for the loss of the finger and should be made to pay for it. The employer has provided the guards, and it is part of your duty to insist on the men using them both by example and advice." However, before leaving him he admitted the soundness of my argument, and promised to use and insist on others using the guards in future. All machinery is dangerous, and no liberties should be taken with it. The following rules printed by the Illinois Steel Company of South Chicago for the instruction of their thousands of employees may not be amiss:

"Remember, that while every man is hired to do some particular work, the safety of himself and his fellow-men is more important than that work."

"Remember, that all the rules and regulations that can be adopted, all the safety devices which can be attached to machines, all the guards which can be erected, all the warning signs which can be posted, are useless unless every man is careful to see that they are maintained; unless every man is careful to watch for danger; unless every man is careful to warn others of danger."

"Remember, that at all times some of the men in the plant are inexperienced and may not know where danger exists. Warn any man when danger is near. He may know all about it. If so, no harm done. If not, you may save his life."

"Every man in a mill should consider it his personal duty to see that safety guards are kept in good condition, and report dangers to his foreman or superintendent."

"Every employee whose duties require him to work with appliances of any kind must carefully examine same and report any defects."

"Vigilance and watchfulness insure safety. To avoid danger adopt the safe course. Employees must not trust to the care exercised by another when their own safety is involved."

"Keep off all railway and crane tracks, except at regular crossings provided for that purpose. Use great care. Before crossing any track, 'Stop, Look and Listen.'"

"Do not turn on any electricity, gas, steam or water, or set in motion any machinery, or throw down any material, without seeing if anyone is in a position to be injured."

"Employees are forbidden to take short cuts over dangerous places."

"Wrestling, throwing of material, or 'fooling' of any kind is positively prohibited."

"Great care should be taken by men working above other men not to drop any material without first giving warning to those below. When you are going to work above or below other men, let those men know about it."

The rules perscribe that all dangerous machinery must be guarded; that all working appliances shall be kept in good order; that all stairways, platforms and overhead runaways shall be railed; that all elevators shall be equipped with safety gates at each floor, and gongs or other signals to give warning of the approach of the elevator. Warning signs and notices are printed in various languages and posted for the benefit of employees who cannot read the English language.

Fan in Polishing Rooms

These places seem to be hard to keep in good order any length of time. The great difficulty seems to be the installing of them properly. Neither employer or employee would do without it if they had it rightly working, as it means a great saving to both. To the employee it means better health and longer life, and to the employer better service from his help and a great

saving on the machinery as the floating particles of emery enter every nook and corner, making it impossible to keep any part of the place clean. I have devoted a good deal of time and attention to getting these places into proper working condition. For the benefit of those who may have to install these plants or overhaul old ones the following suggestions may be useful:

Avoid abrupt turns in your piping, and avoid having two branches enter directly opposite each other; make all elbows of as large a radius as possible. Never enter a branch pipe at right angles to the main pipe, but always connect them at an angle of or from 30 to 45 degrees. Never enter a branch pipe at the bottom of the main pipe, but always at the side or top. Make all branch pipes as short as possible by extending the main pipe. Never make a discharge pipe smaller than the area of the outlet of the exhauster. Carry the pipes in as straight as possible to the separator, avoiding as far as possible abrupt turns. Avoid the use of cross belts or of short belts; always use counter shafts where they are necessary to get the required speed or belt length.

Suggestions to Band Saw Filers

By Edward Snell

My experience as a saw filer has taught me to find the cause. I have seen plenty of the effects. When I get a new saw I always look over it carefully to see if there are any lumps or ridges because as a rule the manufacturers of saws do not know all the conditions of your mill.

First see that the tension is even all around, no lumps, no ridges and a straight back. I then put it on the filing bench and go over all the throats with a half round file to see if it is hard. If so, I take a pair of tongs, heat to cherry red and remove it. Then turn the saw with teeth down and go over the back of same. I have very few cracks. When I do have one that extends in saw say from one-half inch to two inches, I take clean steel filings two-thirds, one-third silver solder, place on the crack between pieces of tin bent in U-shape to hold the solder on the bottom, heat my irons the same as when I make a weld, dress and level. If you are careful you can repair a crack that will run as well as the rest of the saw.

I have found that cracks originate from several causes, such as too much tension, tension uneven, gum on wheels pulling saw off of wheels, scratching saw with file, saw too hard at braze, feeding too fast and above all, a dull saw. Beginners as well as experts will overlook a fast place, which will result in a crack. There has been many a saw ruined by running with uneven tension. You will find this more true when you increase the speed of your machine. Teeth too long, will chatter and cause cracks. If your saw vibrates when running, you must expect center cracks. The straining device must be kept in the best condition. Chips are liable to get between saw and wheel. I always look over my saws as soon as they come from the machine and do not give them a lick and promise but see that they are fit for the grinder. I am running through hard kiln dried maple, hard oak and all kinds of pine. I never change my saws, use the same swage, same shape tooth, same pitch, but when a saw gets dull, I have a feeder take it off and I never could see why, if a feeder sees his saw running back, he wants to use his crossline. That will cause more trouble for the filer and will cause long and short faced twists. I always instruct them never to use that except in case of emergency, such as chips getting in guides. Always have a saw sharp and there is no excuse for using the crossline.

My first instructions in fitting band saws were that I could not drive a bent nail, but if I would straighten that nail, I could drive it. (Did you ever try it?) The same thing is true with a saw. Keep them straight, level, teeth square and sharp and you can drive them through almost any kind of wood. I find it quite a pleasure to go out in the mill and feed the saw. There is something grand to see how they eat the lumber.

I do not use the hammer much but rely on the stretcher. You can keep your saws in a great deal better shape by the latter. I have one saw running and doing good work, made up of three different gauges, 18-19-20. I made this to try an experiment. I use but very little tension and have tried to crack it, but it stands up to the work as good as my best ones.

Wash Rooms Encourage Men's Self-Respect

Different managers have different policies. In one factory cleanliness may be an advertising asset to say nothing of the raising of the workers' self-respect. In another, not only is the plant dirty, but men leave the plant unwashed because of the lack of lavatory facilities. When workmen are obliged to go home from work dirty, because of the lavatory equipment, it is noticeable in the immediate vicinity of the plant. Cheap saloons spring up like mushrooms and the residence district in the neighborhood becomes less desirable, and the better class of workmen become scarcer. Such improvements as are desirable are not always expensive. Quite often the equipment is sufficient, but cleanliness is not maintained.

When proper attention has been given this subject it has been found that the almost constant changing of employees, has been partly eliminated. When a factory is located out of the business district the employer owes it to his employees to provide such facilities and also to provide proper facilities for meals. It is not always possible to establish a restaurant in the plant, but it is impossible for the employer to assist a good man to locate near the plant by either furnishing the building, site, or else by investment. The amount required is not usually large, and most firms can afford to do so. The results are worth the cost.—Factory.

If the users of sanding machines would take as much pains in the operation of them every day as is taken primarily in the making of them, there would be some better finishes and a whole lot less band sanding to do.

The machine man that does not understand blueprint plans works under a handicap that he can remove by a little patient study. Why not do it?

There is more turned work in furniture than formerly, which may be making more work for the old lathes, or more room for new ones. Which is it?

Old and New Methods for Dull Finishes of Furniture

All woodwork is usually provided with some sort of finish, regardless whether the wood retains its natural color or whether it is treated with some sort of stain.

It is of course out of the question to leave a piece of furniture in the perfectly natural state, as every finger-mark would leave its impress on the woodwork and soon spoil it. For this reason even the waterproof stains are mixed with a liquid which will coal the wood slightly, saturate the fiber and prevent the showing of greasy finger-marks, without, however, changing the natural tone of the wood. The ordinary finishes containing shellac cannot be used for this purpose, unfortunately, for even the so-called white shellac changes the fundamental tone of the wood and darkens the wood to some extent. Where the final finish is to be dull and somewhat deadened, wax is added to the stains. The wax robs the stain of its brightness, deadens it in other words. This tone is, however, very desirable in present practice and we will find that only the less costly grades of furniture are finished with a brilliant polish.

The waxing has one drawback, though, in that it reduces the adherence of the stain in the wood, as the wax layer does not permit a thorough bond between shellac and wood fiber. The more wax is used, the worse is the effect. The wax coating ought to be very thin in order to decrease the disadvantages growing out of its use.

Furthermore, only the best stains can be used, as otherwise the effect will be unsatisfactory. For most stains the ones containing pure shellac are the best, regardless whether they are used with or without previous waxing.

The shellac layer is so elastic that it follows the movements in the wood, i.e., the expansion, contraction, shrinkage of the same without cracking. The poorer qualities of resin are not capable of this and care must be taken, therefore, to obtain only first-class guaranteed shellac stains and not cheap products.

All such stains should be applied as follows: First, the stain is diluted with alcohol or else with the preparations manufactured by the various firms and then it is applied with a good bristle brush, always in the direction of the wood fiber. The brush is only supposed to be slightly moistened, to prevent applying too heavy a coating. After drying, the wood is rubbed with horsehair and the stain again applied with prepared cotton waste or the soft brush.

If waterproof stains are used, it is sufficient to wax the woodwork or furniture first and let is stand for several weeks, when the wax will have penetrated the grain completely.

A deadened dull surface can be obtained by simple application of the stain with a stiff bristle brush, provided the tip only is moistened, and the stain applied pretty dry and rubbed into the fiber. The bristles will deaden the shellac mass at once, thus avoiding all polish at the start.

All the ornaments are to be coated rapidly with the brush soaked with the stain. The stain is then worked into the grain with a larger bristle brush, obtaining the dead finish desired.

The chemical industry has of course furnished the woodworker with prepared stains that need no other agent to obtain the desired dull finish. Many of these in Germany have a disadvantage though in that they give the wood a sort of dull grayish gleam that does not bring out the colors clearly.

Some of the compounds have peculiar characteristics. Thus in one of them we can get the dull finish. if we let the stain dry and then rub it vigorously with a horsehair brush. If, however, we rub it with the brush while still wet, we will obtain a polished finish. In other words we have two possibilities of finishing.

Most of these compounds may be used for waterproof stains as finishes, as they react to every degree of moisture. This is very evident in new buildings especially, where the woodwork will take on a grayish tone, which is hard to remove and of course detracts from the beauty of the finished wood. This is, however, a peculiarity due to the composition of the compounds and no fault in preparation.

With waterproof stains the finishing compounds play a subordinate role, as they need not be as powerful in resistance to atmospheric changes and influences as the ordinary stains and paints that give off coloring matter when moistened with water.

Some of the finishes mentioned above can be used to obtain different effects, depending on treatment. The layman will think that three or more different kinds of stains and finishes have been used, while in reality only one is used. One fundamental stain is sufficient, and either the same finishing compound can be used in different ways or else different compounds can be used.

The woodwork in one room can be stained, then polished and waxed; another room can be finished after staining with some deadened-dull finish, and, after half hour drying, be polished with a horsehair brush; a third room can be finished with the same compound and rubbed briskly immediately after application. The result will be three different effects with the same finish.

Testing of Shellac

The following test for shellac is simple and very efficient. It is used to test for colophonium. Add 2 grams of shellac to 20 ccm. of pure acetic acid, heat gently at first, and then heat until the shellac is dissolved. Then the liquid is cooled and slowly mixed with 100 ccm. petroleum-ether, adding the latter to the other mixture.

It has been proved by experiments that natural shellac will remain dissolved in the acid, while colophonium will separate in the petroleum-ether and can be recovered from it by evaporation and then be weighed. This method will prove satisfactory. The shellac ought to have at least 3 per cent. of colophonium. Less percentage shows poor quality of shellac.

Another method is the following: 2 grams of finely pulverized shellac are mixed in a shallow porcelain dish with 10 grams clean fine river sand and then mixed with 4 ccm. alcohol, to which is finally added 20 ccm. concentrated hydrochloric acid. Then we evaporate the mixture to dryness and repeat the addi-

tion of alcohol and acid. The dry residue is now left to stand for two hours in an air bath at a temperature of 212 to 221 degrees F. After cooling, 20 ccm. alcohol are added and the mixture allowed to stand for 12 hours longer. The solution is then poured through a filter into a calibrated flask, the residue in the dish mixed with sand and gradually washed in small quantities with 20 ccm. alcohol, until finally we have, including the filtrate, which is also washed, about 250 ccm. filtrate. The residue will consist of wax and certain condensate products. The analysis of the best shellac gives: 87 per cent. oxides (condensate); 5 per cent. shellac-wax; 8 per cent soluble fats and resinous elements, among which are organic salts. If we find more than 8 per cent soluble matter, the shellac is unsatisfactory.

Some Practical Tests for Varnishes

By Arthur Seymour Jennings

Although no absolutely reliable tests can be applied to varnishes to determine their durability, yet there are certain points about them which will assist materially in that direction.

The first is color, and it is always useful to have some very small bottles at hand—those specially made for the purpose are best, and cost very little—so as to pour into them a little of the varnishes under examination, again having a standard in the several grades.

The depth of color will not tell much, because that will depend upon the grade, and although it would be a serious defect in a varnish to be applied to white work it would not be of much moment in some other cases. But there should always be an absence of turbidity or muddiness. If the varnish is more or less dark it should yet be clear.

There are two practical tests which may be easily applied, and both of them will give an indication of the presence of rosin, which I venture to assert is always an objectionable ingredient in varnish, excepting in very small quantities. It is, however, added principally for the purpose of cheapness and partly to lower the degree of heat necessary in melting the gum resins, which are the chief ingredient of most varnishes.

Place a sponge saturated with water on the surface of a coat of varnish and leave it on over night. If there is much rosin present the varnish will be found to be white, and probably more or less wrinkled. If the varnish is a good one, however, there will either be no white mark at all, or if there is one it will regain its color when dry.

A pad made of several thicknesses of felt saturated with water is better than the sponge, as it will touch a larger surface, and a light weight may be placed upon it to hold it in contact with the surface.

The second test which I recommend is to scrape the dry surface of a coat of varnish with a sharp penknife. If the varnish is of high grade quality the ribbon scraped off will be tough and sharp at its edges; if much rosin is present the edges of the scraped portion will be ragged and the film show distinct signs of being brittle. This test is a good one also for linseed oil.

This question of hardness of varnish is so important that Dr. A. P. Laurie some time since patented an instrument, the principle of which was simply that of scratching a dried and varnished surface by means of a steel point.

The apparatus enables accurate readings to be taken, and it has been found that a fine carriage varnish will withstand a pressure equal to 1,200 grains, fairly good common varnishes 700, rosin varnishes 200 to 400, and spirit varnishes only a pressure of 100 grains.

Thus we see why it is that the latter are bruised with even a light blow, while the best carriage varnishes will withstand a considerable force.

The smell of varnish gives some information as to its quality, while the time taken to harden the degree of flowing and working under the brush all yield useful information.

It may be added that it is the opinion of Dr. A. P. Laurie, based upon the experiments he has conducted with his instrument, that the best oil varnishes do not attain their maximum hardness until twelve months after they have been applied.

The question of brilliancy of gloss I have not entered into, as this will be sufficiently obvious in comparing several grades of varnish. It will be best to conduct these experiments in a well ventilated room heated to a temperature of about sixty degrees. A very hot room containing moisture-charged air is not suitable, as the conditions are adverse to the varnish properly drying, and may yield erroneous conclusions.

The instant that you make up your mind that everything is coming your way and that you need not hustle any longer, that minute things will stop coming your way.

Twenty centuries of business have honored the infallible Greek proverb, "To Earn More, Learn More."

There is no truer law.

The vital problem with the employer is not—how can I secure richer dividends, but—how can I devise the ideas and plans that will produce them.

And so with the employee, not—how can I scheme to get promotion, but—how can I study to fill it when it comes.

You long for bigger salary, larger profits, greater success.

Then develop bigger ability, larger capacity, greater thought.

No bar and padlock stands between you and the place or opportunity of your ambition. Its door is always open, and you can pass in whenever you will—if you can show the passport of competency.

Success has its price—and you can pay it if you will. But ability is the only coin that passes current in its purchase.

Canada's Half-Yearly Building Returns

THE building operations throughout the Dominion for the first six months of the year 1913 show, when compared with the same period of 1912, a slight decline. The total of the permits issued in the thirty-two cities tabulated below amounts to $79,787,919 for the first six months of the present year. The total for the same period of last year was $87,353,151, indicating the very slight decline of eight per cent. However, it must be remembered that the year 1912 was an extraordinary year. When the totals for the first half of 1913 are considered apart from any comparison they show a building expansion that would be highly gratifying under ordinary circumstances but our proneness to make comparisons gives rise to a feeling of disappointment because we have not surpassed last year when as a matter of fact the showing has been very creditable indeed.

Out of thirty-two cities reported twenty show a substantial increase, while the remainder show a decrease when compared with 1912. In the amount of permits issued Toronto still leads, with an increase of four per cent. The increase for the first five months of the year was considerable but June showed a decline of over a million dollars. Montreal is second in the value of the permits issued and shows an increase of twenty-three per cent. The highest percentage of increase falls to London and Port Arthur, both rejoicing in a growth of about one hundred and ten per cent. over last year. The increased percentage represents in London about one-half million dollars and in Port Arthur about three-quarters of a million.

The decline, of course, is due to the money stringency, and it is hoped that the spring will see a marked recovery in tone and confidence.

Sap Streaks

To prevent sap streaks in oak wood from turning black where golden oak stain is used give special treatment to them. Bleaching is not satisfactory because the expense is greater than the cost of the material. The usual method is to stain these sap streaks first with a very thin coat of stain. The same is done to the filling. Finish as usual.

Nine times out of ten it is not because men do not work hard that their efficiency is low. It is because their efforts are poorly directed and their working conditions adverse in some way. Too many economists preach parsimony instead of efficiency as a means to a profitable end.

City	June 1913	June 1912	First 6 mos. 1913	First 6 mos. 1912	Increase per cent for 6 months
Toronto	$2,036,928	$3,292,766	$13,734,410	$13,195,271	4
Montreal	2,278,424	1,718,505	9,942,285	8,065,993	23
Winnipeg	1,843,350	3,210,370	9,531,400	11,487,150	17*
Vancouver	908,881	1,219,780	7,118,253	8,132,720	12*
Edmonton	1,428,615	2,567,235	6,345,490	7,538,862	18*
Calgary	1,498,620	2,210,000	4,483,620	8,540,670	48*
Hamilton	550,000	670,600	3,391,450	3,145,600	8
Victoria	365,985	617,860	2,757,765	4,647,600	41*
Regina	810,995	1,048,830	2,726,130	2,549,770	7
Ottawa	578,650	417,750	2,646,505	2,120,000	25
Fort William	431,735	232,070	2,636,835	1,743,425	51
Saskatoon	249,310	1,601,000	1,859,395	4,634,000	59
Moose Jaw	551,610	531,555	1,667,895	2,194,525	24*
Medicine Hat	248,515	212,445	1,366,680	1,000,617	36
Maisonneuve	241,750	243,200	1,153,123	1,572,428	26*
London	155,653	140,558	1,063,867	509,598	109
Port Arthur	511,895	174,884	1,475,805	702,474	110
Prince Albert	304,600	278,900	1,055,690	1,008,300	4
North Battleford	352,600	335,285	736,095	565,190	30
New Westminster	139,875	96,850	719,135	785,578	8*
Windsor	183,125	114,125	513,790	433,330	18
Berlin	42,675	85,925	419,229	340,058	23
Lethbridge	24,112	103,503	402,555	719,345	44*
Kingston	49,960	75,335	354,295	224,059	58
Brandon	182,769	154,850	350,919	354,850	1*
Peterborough	94,806	67,095	305,165	187,858	62
Galt	31,810	28,080	256,737	209,032	23
Welland	34,976	19,313	229,186	124,186	85
St. Catharines	55,720	128,950	236,780	338,640	30*
Nanaimo	11,000	36,853	160,965	125,292	28
St. Thomas	22,100	5,280	74,570	40,645	83
Chatham	10,300	19,090	71,900	116,085	38*
	$16,231,344	$21,658,842	$79,787,919	$87,353,151	

A falling off of about 8 per cent.

*Decrease

Some Characteristics of Good and Poor Glues

Experiments that can be made to test the quality of glue vary greatly. There are at least ten factors that ought to be considered. Among these we have: General appearance; analysis of ashes; characteristic odor; acid or alkaline reaction; quantity of fat in glue of a certain concentration and temperature; sticking power; test as adhesive agent; absorption of water; viscosity. Some of these tests can be made in any ordinary shop, others again only in the laboratory.

Good glue should be very hard and elastic. When struck on an even hard surface it should give a clear, clicking noise. It should be very transparent and in a pure state have therefore a very light shade of color. If the surface is free of bubbles and spots, and if the cakes of glue break evenly, the glue is satisfactory. The thinner the cakes are, the better is the glue.

Odor and Other Peculiarities

No glue should be accepted that has a foul odor; glue of good quality always smells pleasantly. It should have neither an acidic nor an alkaline reaction, a fact which can easily betested out with litmus paper in a solution of glue. If the glue acts acidic, the blue litmus paper turns red; if alkaline, red litmus paper turns blue. The glue should react neutral, i.e., it should not color litmus paper at all.

The test for fatty constituents is made as follows: A little aniline dye is put on the end of a brush on which a little glue has been placed. Then a piece of paper is taken and circles described on it with a brush. Then the same brush is quickly passed diagonally across the face of the paper and the circles. If there are white spots on the surfaces touched by the brush, we have a certain indication of fat in the glue. The more white spots appear, the more fat is contained in the glue.

To test the adhesive power of glue, the liquid glue is placed in a vessel which has a hole in the bottom, through which the glue is allowed to flow. To examine the glue, 25 parts by weight of dry glue are dissolved in 100 parts by weight of water at a temperature of 65 degrees C. (149 degrees F.). Previously we have determined how long a known quantity of water takes to flow through the opening in the bottom of the flask. Now the same quantity of glue is passed through and the time noted down. Water of course being very fluid passes through quickly, while glue being sluggish passes through very slowly. The more sluggish and consequently the more sticky the glue is, the more time it needs to pass through. With two glues of the same constituents we can easily determine which has the greater adhesive power and has the better quality.

The so-called foam test can be made by using an ordinary egg-beater and beating the liquid glue for about 45 seconds and then watching the foam. If this foam remains for some time on top of the glue, in other words, does not soon disappear, the glue is not without fault.

For testing the adhesive power, i.e., its power as an adhesive agent, there are really no absolute tests. The best and simplest is the following: Thin sticks of about 0.5 cm. (0.2 inch) thickness and 5 cm. (2 inches) length are cut from a well dried piece of wood, preferably beech, then cut through in the center, and glued across these cuts. After drying for 72 hours, the sticks are suspended between two supports, and the center tested with loads beginning with 25 kg. (50 pounds) and then increasing the load by 5 kg. (10 pounds) from minute to minute. Up to the moment of break at the glued edges, good glue ought to stand at least a load of 70 kg. (154 pounds).

Wood Strength and Glue Adhesion

This test, if properly made, will show the adhesive power of glue, for since we glued cross-cut edges together the glue must separate from glue at the breaking point. On the other hand, if the test is made by gluing the sticks parallel to the fiber grain, as is often done in practice, we obtain the strength of the wood but not of the glue. Only with poor glue and by a poor method of gluing, as in this latter instance, will the glue separate from glue at the maximum load. In most cases the wood will part from wood. In other words, the test executed in this latter manner is not a true test for the glue as much as it is a test of the wood.

A simpler test for quality is to test its absorption power for water. The glue is allowed to soak for 24 hours in a water bath at a temperature of 15 degrees C. (59 degrees F.). The glue must absorb a large quantity of water but must not dissolve even if it remains longer than 24 hours in the bath. The water left over should have a sweet odor and should not contain appreciable quantities of dissolved glue. Experience has shown that the best glues absorb the most water and require the largest quantity of water for mixing.

Spreading and the Veneer Work

The test for spreading the glue consists in determining the quantity of dry glue needed for coating a certain surface of wood. This test is especially important for veneer work. We take a known quantity of dry glue, which we soak in a known quantity of water, which must be the same in temperature and quantity for all the sorts of glue tested. Then we determine how many square feet of surface can be coated evenly with the glue. That glue which allows the larger surface to be coated is the better.

It is possible when unscrupulous persons know that the purchaser tests his glue only for adhesive powers and viscosity that they might mix the glue with substances that increase its adhesive power but do not improve it otherwise. To test for these admixtures, one part by weight of dry glue is soaked in four parts of water and the mixture is then left for twenty-four hours. Then the mass is increased to 17 parts by weight on adding grain alcohol. After vigorous stirring the liquid is allowed to settle, the residue is filtered and carefully washed with a mixture of three parts of water and one part of alcohol. The residue is then weighed, and its percentage compared to the original weight, of glue shows the quantity of useless aggregates added.

The man who does his work cheerfully is not only a source of satisfaction and pleasure to those around him, but he gets more satisfaction out of life himself.

Carpentry and House-Building

A permanent department devoted to practical problems of construction and planning. Readers of the Canadian Woodworker are invited to contribute to this department and to submit details of work involving special difficulties.

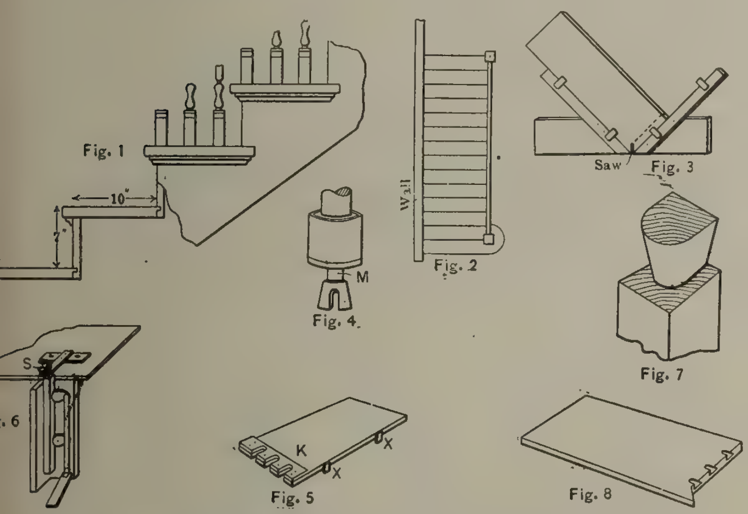
The Planing-Mill Machining of Stair Work

By W. H. Bohr

There are textbooks on stair building and handrailing but they do not give details of machine work and many young machine men look to their trade journal for information along all lines of machine work.

I do not claim to introduce anything particularly new, but rather endeavor to give readers the benefit of my experience while employed in a big shop where I was called on to machine out work for the stair builder. Nor will I take space to cover all details—only offer a few that I think may be of the most interest and benefit.

Fig. 1 shows the plan of a portion of stairs using



Several Convenient Kinks in Machining Stair Work.

a cut and mitered outside stringer with treads having their ends mitered for return nosing. The lower part gives a detailed working drawing.

Fig. 2 is the ground plan. According to the ground plan there will be thirteen straight steps and one bull nose step; likewise fourteen straight risers and one bent riser.

Referring to Fig. 1 the pitch is seen to be 7 by 10 inches so that the net width of the riser according to this detail will be 7 inches. The back edge of the tread is rabbeted so that a 5/16 inch projection fits into the groove of the riser and the nose projects past the riser for 1⅛ inches. Therefore, the total width of the tread will be 11 7/16 inches. The tread finishes 1 1/16 inches thick; the riser ¾ or 13/16 inch and the cove is No. 8060, ¾ by ⅞ inch. Now these treads must be mitered for the return nosing, which will be the same width as the front projection, or 1⅛ inches. Referring to the ground plan, Fig. 2, it is seen that the right hand side going up is the end to be mitered for the return nosing. Then this end of all the treads should be trimmed square and one tread laid off and adjusted in the form, Fig. 3, for cutting the miter. This form can be clamped on a sliding table trim-saw or a universal saw with gage running in a groove. Anyway it must be on a trim-saw that can be adjusted for depth of cut.

After all are mitered they may be, by the use of a stop block or gage, trimmed up on the dotted line, see Fig. 3, as far as a circular saw will go without cutting past the miter, then finished with a hand-saw. Now they are ready for dovetailing.

Plan in Fig. 1 shows three balusters per tread, so lay off one accordingly. There are different methods of dovetailing treads, necessarily so on account of different machines. I used a regular stair router, having a bit like Fig. 4, above which was a double collar, the outer shell being loose, and thus prevented friction and wear when in contact with guides or forms.

Getting Dovetails Rightly Placed

To bring the dovetails in the right place I made a form like Fig. 5, the recesses of which coincided with the layout of balusters on the end of the tread. The recesses were just wide enough to admit the collar above the bit. They were 2 inches wide in this case, and cut back 2½ or 3 inches, then a little stop block was nailed underneath to gage the depth of the dovetail from the end of tread. Two little blocks XX were tacked on the side for the edge of the tread to come against.

This form, of course, fitted down over the tread and the two were held in place on the table by a large screw clamp, one end of which was fastened under the table and the screw tightened down on the form at about K, see Fig. 5.

Now if turned balusters were used the turner turned a dovetail on the lower end of each of them and the cut in the end of the tread was made to fit this; but if square balusters in an upright position as in Fig. 6. This figure is practically self explanatory.

The apparatus holding the baluster in position is operated by the foot. The guide bolted to the top is made of iron ½ by 1¼ inches. The height of the baluster may be adjusted by the little set-screw S. Fig. 7 shows the end of a baluster dovetailed in this manner.

When balusters are dovetailed the shank of the bit marked M comes in contact with the iron form.

Fig. 8 shows a tread completely machined.—Wood Craft.

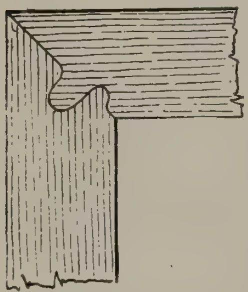
Helpful Ideas for Carpenters, Cabinet Makers and Machine Workers

An Octagon Trick

Here is a trick I saw a carpenter do some ten years ago and have never seen it done before or since and am sure it has never been published. Take for instance a square pole tapering to a small end to be changed to an octagon. On the larger end he laid out

To mark a tapering stick for cutting into an octogon.

an octagon to find how far the corner would be from the side; and, as the pole was tapering, this distance would decrease. Now, to lay out both ends and use a chalk line, would not do, as the pole was not very straight. He took a strip about ¼ of an inch square and placed it diagonally across the pole and drove a nail through it at each side of the pole, then he cut a notch at the octagonal line on each side, slid the stick up the pole, keeping the nails bearing against the sides of the pole while he held a pencil in the slot which gave the required gauge line.



Novel Miter Joint.

Some Miter Joints

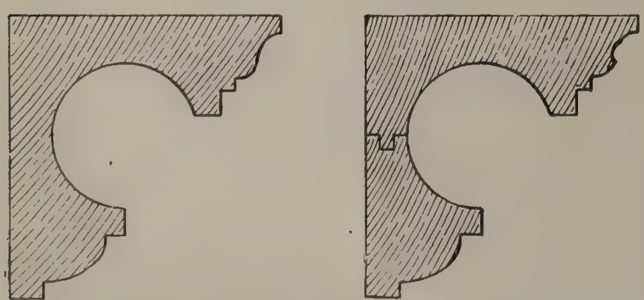
Here is one I had sprung on me by a young architect for a newel corner. It makes a good joint but the estimator should tack on a few extra cents for them. This gives a large glueing surface; but it takes time to fit up. I made them on the variety moulder; but if I had many of them to do, it would be done on the moulder.

He Lengthened His Legs

An extra tall bench hand working stair ramps in his vise complained to a short Italian working at the next bench of his (the tall man's) back being nearly broken from bending over. The Dago said: "Maka de legs longer." (Tall man) "Make legs longer! what are you talking about man? for this job they are too d—— long now." "No, no," said the Dago. "De ah bencha legs." So Mr. Tall Man nailed a couple of slabs on the bench legs (on one end) raising it up about 6 inches for the time being; and they were fast friends ever after.

To Cure Draftsman's Nightmare

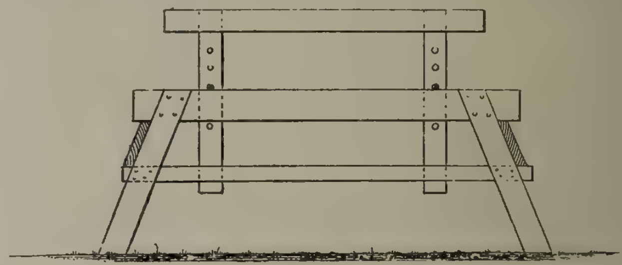
In the ordinary planing mill, where house work is made from architect's details, there are many very odd shapes of mouldings to contend with; each draftsman has some peculiar nightmare to put over on the poor mill man in order to bring out what might be termed his own originality—such as a cove moulding like the first illustration. Now then, this moulding cannot be run on the ordinary moulder on account of the under cut. So Mr. Moulder Man, makes it in two pieces and glues them together, as shown in the second illustration.



Under Cut Moulding, and How it is Worked.

Adjustable Horses

I saw once during my travels a pair of carpenter's saw horses that were made so that the height could

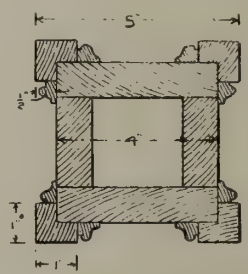


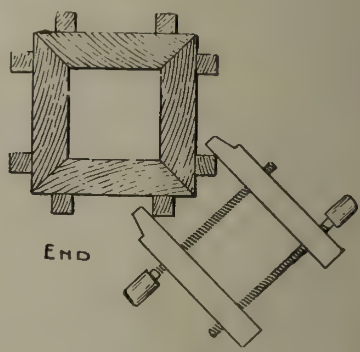
Adjustable Saw Horse.

be adjusted to meet different conditions of work. The illustration will convey the idea of how they were constructed.

Something About Newels

A very practical way to make newels is to box up the post one inch smaller than required, rabbet out corners one-half inch and put on with glue, and there will be no nails in bottom where the post is likely to be notched out—as most carpenters do not carry a





Cuss-word-proof Newel. **Scheme for Gluing Mitred Corners.**

hack saw but do carry an extension brimstone vocabulary; anyway the panels can be formed by putting in pieces one-half inch thick where necessary. The illustration shows end section.

Another way to put a mitered corner newel together, is to glue temporary blocks on the face near the edge to get the hand screws to hold to while glue is drying. Of course this is not the quickest way but it is one of the best.

Another way to put a mitered newel together is to saw out two pieces and nail on top of saw horses

with a slot cut into them large enough to take the newel and hold it while the hand screws are put on cross-wise. The newel can be taken from the slots as soon as the hand screws have been put on and another can be clamped up.

A Wrinkle in Screen Door Manufacture

By W. H. Bohr, in Wood Craft

With the coming of summer the screen season again opens. As screens must be made quick and cheap a handy wire stretcher is most essential. Most of the shops and factories have some kind of a rig, some good and quick, others slow and awkward. I know of a small shop that makes lots of screens without any screen stretcher at all, simply because the boss didn't know how to make one.

In Fig. 1 I show a screen stretcher I have seen used in fact practical work. It is also simple, both in construction and operation.

After laying the frame to be screened on the table with the bottom rail against A. Fig. 1, pull the wire out over it and securely tack it to the top rail. Then pull down the lever B. This holds the wire securely all the way across, while it is stretched taut by pulling the frame forward with lever C. Lever C may be held anywhere along its course by the ratchet. While the wire is thus stretched it can be tacked fast all round and then cut off.

The levers are placed conveniently so the workman can operate them with his left hand. This equalizes the strain on his body and enables him to go ahead without laying down his hammer. The wire is held in a handy rack as shown. The rubbing surfaces at D and E must be reinforced with strips of leather belting or iron.

The piece A may be moved forward with a small eccentric lever similar to B, set horizintally at the end

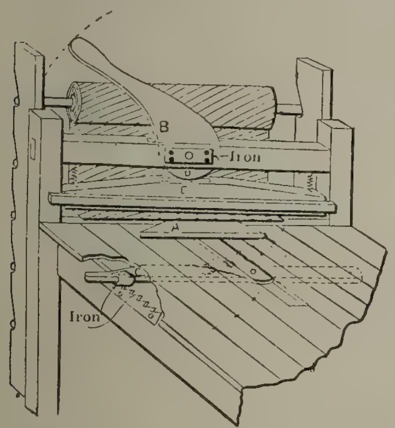


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 1—Device used in Screen Door Plant.
Figs. 2 and 3—Forms of Screen Moulds.

of the table but a few more steps are required to get to it each time. The lever C is a much better scheme.

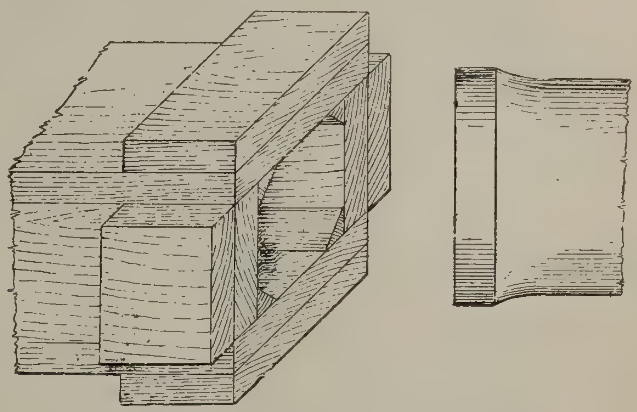
Fig. 2 shows a neat appearing screen mold that is a relief from the old clover-leaf and bead molds.

Fig. 3 is a neat mold that can easily be made in the little shops where no sticker is on hand. The ¾-inch rippings, SS 2 S, are ripped to ⅝ inch, then molded both sides on the jointer and finally ripped in the middle; or they may be run single on the planer.

When stuck on the sticker, screen molding should be slightly hollow backed, as per the dotted line in Figs. 2 and 3.

To Piece Out a Column in the Rough

Oftentimes mill turners have to stave up or rather glue up boxes for interior columns where there is to be a fillet on the bottom that extends so far that in order to turn it out on the column, it would make the shaft at the base too thin. I had an occasion of this kind recently in quartered red oak. I boxed the col-



Flaring Ends are Built Out with Blocks.

umn up as shown in the sectional drawing, I ordered the four side pieces three inches longer than I needed. When the material came in the shop, I cut off three inches of each end and numbered them where I cut them off, so that the grain and color would match later, when I glued up the column boxes; after they had dried out, took off the clamps and glued on the three inch blocks (matching the numbers) to allow for the fillet.

Curing Wood

Wood has contagious diseases! A stick of wood in a lumber yard may be sick and infect other timbers, which later may develop the disease when they are supporting great weights in a new building. Some of the diseases are so contagious that in a building they will jump several feet across masonry or brick to some stick of healthy wood. Cures were recently discussed by the American Society of Mechanical Engineers.

Most of the diseases are varieties of dry rot caused by a fungus, and most of the varieties of the dry-rot fungi cannot stand heat much over 100 degrees; so the most likely cure is to close a building up tight, if any beams are infected, and heat it up to 120 or 140 degrees. Even this is not always successful, for ends of beams are buried in the outer brick walls and the heat may not reach them.

In England the changes in the rates of wages taking effect in April, affected 502,000 workpeople, and resulted in a net increase of nearly £24,900 per week. The most important changes were net increases affecting 417,000 coal miners in Cumberland, the Midlands, Yorkshire, Lancashire, North Wales, Bristol and Somerset; 17,000 ironstone miners, limestone quarrymen and blastfurnacemen in Cleveland and Durham; 20,000 ironworkers in the Midlands; 8,250 blastfurnacemen and iron and steel workers in South Wales and Monmouthshire; and 10,800 woolcombers in Bradford and district.

What Makes Factory Efficiency

At its Basis is a System Enabling Man to Produce More With Less Effort—Standardization of Operations—Beware of Over Systematizing the Factory

IN the early days the farmer used to burn the forest for the potash which he could secure and that was the only commercial product to be had from the magnificent forest. Trees, to him, stood in relation to his living as weeds, and he used the easiest means possible to get rid of them, said Mr. Geo. H. Sheppard, of the Emmerson Company, Efficiency Engineers, in an address to the National Association of Upholstered Furniture Manufacturers, at Chicago, recently.

Different ideas of efficiency fill the minds of different people in much the same way. A popular fallacy has grown up that efficiency means driving labor, while in fact, it is only the practical application of a system which enables man to produce more with less effort.

All accomplishment in the world comes from ideals. They involve clear and high thinking. No individual ever arrives anywhere until he has set up some ideal for himself. In the same way no business succeeds unless it has a definite and clearly defined purpose. The use of expert knowledge in carrying out the ideal is well demonstrated in the case of Mr. Baer of notorious connection with the coal industry in Pennsylvania. When he was called to take control of the coal mining business, he was occupying the lawyer's chair, but he was able to draw to his aid experts in their several lines for carrying on the many different divisions of the mammoth business. In the same way Carnegie stated that his success depends upon his being able to draw to him many men who knew more than he did about their particular work.

So in the industrial organization we must have expert handling of all these different phases. We have passed the time when a single man carries all the details of even a moderate sized manufacturing business.

In the industrial organization we have two methods of carrying out or executing an enterprise in what is known as line, and staff. In the line organization we have the president over the manager, manager over the superintendent, superintendent over the foreman, and foreman over the workman. If there is any defect along the line, the actual results of production are likely to be disappointing. In the staff organization a number of men are appointed to various divisions of work, each thorough and complete in his own field.

It must not be forgotten that in factory organization we are dealing with a living machine. Contrast the care that is exercised in the selection of materials with the hazardous method of providing the personal element in your factories. So many times a man is taken on without regard to his temperament or ability, only to be fired soon after because he has not fit the place. The square man trying to fill the round hole.

As to discipline, there are two classes of discipline, that which is of the strong arm variety, where a man works with fear, and the efficient discipline, which is based on the standing of the workman as a living organizm. All discipline must be based on a fair deal; so long as capital and labor are on a war footing, there is no possibility of a fair deal. In securing a fair deal, it must begin from the top. The employer is the one who has the position from which negotiations must begin. The greatest obstacle in a fair deal is ignorance.

Having desire of accomplishments and secured confidence that a fair deal will be employed, we thus find it necessary to set up standards as a stimulant to production. The establishment of standard time and motion studies has been employed and is designed to eliminate waste by the saving of time. Time and motion studies are most difficult of attainment where jobs are of a varying nature, as in the case of repair work.

In the establishment of standards the first suggestion comes that conditions must be standardized to enable the greatest uniformity to be attained. Standard times can be set up without the making of standard conditions which are very largely in the hands of the employer.

In the standardization of operations, caution should be given to see that over systematizing does not occur. When the army is drilling upon the city streets, each man steps to the beat of the drum, carries his gun at the same angle and in many ways the most beautiful uniformity is produced, but let the regiment go to a country road or through open fields and forests, the order is given "break step" and each man finds the easiest action for himself. We learn from this that any system which does not allow for individual initiative is dangerous for organism and is likely to cover up many a valuable idea from the men.

Having found our standard operations, then comes the necessity for instruction. In this connection I wish to commend Prof. Cooley's statements about the part time schools of Germany and am glad that they have come up in this discussion. I believe that he has found the solution by which practical method for American industrial conditions will be worked out with profit for both master and man.

I am a retired officer of the United States navy, and once upon a time, soon after getting a commission as an officer, I was jumped upon by the superior officer on account of my watch having stopped. He said, in reply to my explanation, "You should have foreseen this." So it is often in the case of the manufacturers who plan large matters that because he does not anticipate difficulties, will fail in the details. Jobs are entered in our factories and turned adrift to take care of themselves.

If you will stop to think of all the persons and agencies employed to run a train from Chicago to New York in order that it may arrive on a certain minute, you will be astonished at the cost to produce what, to us, seems to be such a common thing. In the small matter of a single job in comparison with this, it is distressing to note what a lack there is in the simple dispatching of an order from the office to the customer. There should be a central controlling agency.

We often find a factory where knowledge has been preserved in a vast amount of reports without any immediate use. The controlling records must be not the same day or the same hour only, but often within the same part of the hour to be most effective. It is often heard that these records are expensive. In actual figures it has proven that they greatly reduce cost.

In the treatment of the workman, I wish to call your attention to the error which is often made, that

of a case wherein the workman who had become very proficient as a piece worker, caused the worry on the part of his foreman because he was earning too much per day. The statement was made, "I do not know how to keep this man from earning too much, because he will make all the rest of the men dissatisfied." Contrast with this in the reward of efficiency which is the crowning feature, although not the entire work of efficiency methods. In the setting up of standards in efficiency, the reward should be regular and the workman should not be ignorant of what he is striving for, else no effort will be put forth.

It should be clearly understood between master and man that after once the limits have been set, the workman is guaranteed in the full return for his thought and effort. So shall we accomplish that greatest to be desired result—master and man in partnership.

Chinese Carpenter Builds Roof First

I wish that I could show you a set of Chinese carpenter's tools, but as I cannot I will describe some of them, writes a correspondent of the Monitor. Although odd and crude they are very effective, and a lot of really creditable work is done with them. The handsaw is about 14 inches long by 4 inches wide and very thin, with the teeth all set in the opposite direction from those of American saws, so that in use it is drawn toward one instead of being pushed. At the end is a little piece of steel forged out to which a round handle about the size of a hammer handle is attached.

The plane with which Chinese carpenters smooth and straighten edges is something like that used in America, but it is much smaller and the steel knife, like the teeth in the saw, is set so that the user draws it toward him instead of pushing it as other carpenters do. Instead of the chalk line an ink line is used. A piece of bamboo is so shaped that one end has two prongs, which hold a reel; the other end is cut out so as to leave a pocket in which waste is placed and saturated with ink. Then a string is rove through holes in the pocket and wound up on the reel. On the outer end of the string is a hook-shaped piece of wood, which is dropped over the end of the board to be marked. Then the carpenter walks to the other end carrying the marking pot with him, which unwinds the string. As the string passes through the inked waste, it becomes saturated and the workman only needs to haul the string tight and snap it to make a long black mark. This he repeats as often as necessary, or until the ink on the string is all used.

When building a house the carpenter keeps in line with his tools, working backwards. He builds the roof first and puts it all together on the ground, then jacks it up to the proper height and the rest of the house is built under the roof. The required number of logs are delivered on the spot where the house or building is to be erected, and the log is selected which the carpenter thinks will cut to the best advantage. It is laid off as it is to be sawed up, with the marking pot and line; then one end of the log is lifted upon a saw horse. One man gets on top and another under the log, and with a large two-handed saw they proceed to saw the log up into timbers and boards.

If a brick or stone house is to be built the roof is raised as described and the brick or stone built under it. A sawmill does not pay in China, because labor is so cheap. Take for instance a teak log two feet square and 30 feet long, just as it arrives from India. If cut into one-inch boards at a sawmill this stick of timber will produce about 21 boards, but if sawed by hand it will produce 22, and this extra board pays for the labor that it costs to saw the log into boards. They get one more board by hand-sawing it, because the handsaw is thinner than the power saw.

Many visitors to China and Japan see these primitive methods of work going on, and come away with the idea that if the people would use modern methods it would be much cheaper. But the Chinese have figured things down to the most economical condition when everything is taken into consideration, and when we understand their ways and know the necessity of saving every little thing that is possible, even to the tenth of a cent, we shall see that the Chinese people are the very best thinkers and are doing as well as any race could do under the conditions that exist in China.

Three-ply Veneer for Box Stock

Probably no one is more surprised than the veneer man himself at the wonderful progress that is being made by built-up or three-ply lumber in the packing box trade. It is only a few years back that many of the wise ones in the veneer trade had but little faith in much development except in the fine or face veneer, and in the making of three-ply panels, with face veneer on them, for furniture, says Joe Tuttle, in Veneers. To-day one has but to walk around a little in the wholesale district of any large city to see for himself that the three-ply box is becoming quite conspicuous. From this it is easy to realize that the thing has just begun, and that the future looks mighty big and bright for this branch of the veneer business.

Somewhere between fifteen and twenty years ago there was a somewhat pretentious effort made at this three-ply box lumber business, which was given up after some rather expensive experimenting. It, like many a progressive effort, came a little ahead of its time. Lumber in wide stock and pretty good grades was then plentiful and cheap compared to what it is now, so that the veneered stock could not be made in competition with it, and the box makers and shippers had not yet taken up the matter of saving in box weights and of utilizing the second-hand boxes. Since that time many things have happened in favor of the progress of the three-ply box stock. Lumber for box factory use has gone into much lower grades, and also into higher prices. Single-piece stock for box sides and ends is now an expensive proposition, and the three-ply box has a better look-in.

What, perhaps, is the biggest tobacco box factory in the country has been making and using this three-ply stock for several years. It is not making a noise about it, nor booming the idea, but has been cutting lots of veneer and working it up into three-ply stock for some time—long enough to have passed the experimental stage some years ago. Following right after this has come a gradual growing into prominence sizes from comparatively small packages to those big boxes that look like four-feet square. Three-ply stock in single pieces for sides, ends and bottoms, is the rule, giving a light, strong panel, supported by heavy cleats on the larger boxes and light ones for the smaller.

Larger ones have heavier cleats, and all illustrate a combination of veneer panels and narrow short stock in lumber that can be made from low grade, and makes a light, strong package, especially when strapped or wired.

For lighter work the single-ply veneer box enters in more active competition with the fiber and pasteboard package than anything else, and the use of these

light wire-bound packages is increasing rapidly. This has been seen right along, and is perhaps more fully understood and appreciated than the progress in the three-ply box. This latter package has been growing up quietly, and not making much noise about it, but it has been coming forward persistently, and promises to be a big factor in both the box and the veneer business in the future.

It is the simplest kind of a panel-making proposition, and one can work for quantity and economy in the making of both the veneer and the panels, as the requirements are not anything like so strict as in the making of furniture panels. The main essential is to get a good glue joint. Almost any kind of wood may be used; it may be cut less tight and at greater speed than cabinet veneer, thus making the task easier for both the machines and the men using them. The box stock is generally made in pretty large quantities, so there is not so much changing of machines and trimming saws as in making furniture panels; it is, in fact, a business at which one may work to the maximum of capacity and economy in the making of three-ply. It is a proposition that should appeal especially to those out in the woods, cutting common veneer, who have a desire to get into the panel business, and to basket factory men who want to enlarge their lines. If handled right and enthusiastically, it should be comparatively easy to add to and build up this business rapidly.

Trade Instructions for the Furniture Industry

The present age emphasizes the importance of a practical education for every child, says Mr. E. G. Lindstrom in The Furniture Worker. It concedes that equal effort at any worthy study produces equal intellectual capacity. Art, formerly tabooed, now has its place in every modern curriculum. It was therefore to be expected that schools for hand training would be the outcome of this modern viewpoint, so that in many cities the high schools and even the grammar schools have adopted manual training.

Trade schools and schools for industrial education, while there is a great difference between them, are the great and most vital problems in the present industrial age and they must be dealt with in a sane and intelligent manner, if the desired results are to be obtained. The education must be thorough, teaching the principle rather than the rule, demonstrating to the student the why and wherefore, rather than producing samples of it.

Trade schools, endowed, private, or public, are not only of vital interest, but are little understood theoretically by many fair-minded people. It is not denied that many of our trade schools on the American continent are not conducted on broad lines; i.e., for the interest and welfare of the young man, but rather for the interest of the few greedy capitalists, who in time of trouble draft these half-trained men and boys to take strikers' places, and thus prolong strife. "Some trade schools in our country are good and some disreputable," said a Harvard lecturer recently.

The manufacturers criticise the prevailing trade schools as being schools with shops attached where they should be the reverse. Instead of being conducted by professional school men and being dominated by their ideas they should be managed by manufacturers, and the teachers should be practical mechanics, giving instruction in the trade as it must be practised outside the schools. The difference must be sharply made, schools for industrial training are those in which the practical is supplemented by the theoretical; while trade schools make the practical mainly subordinate to the theoretical. Hitherto the adjustment of these two extremes of educational ideals has not been made.

The National Society for the Promotion of Industrial Education was organized in 1906, with these aims in view: 1. To examine and report upon conditions in respect to industrial education in this country, and to compare them with those prevailing abroad. 2. To recommend type of model trade schools adapted to the needs of particular communities. 3. To propose methods whereby these trade schools may be articulated with the existing system of public education.

In a recent periodical I find these sentiments which are vital to the question under discussion:

"Three elements will be found in the community, urging from different directions the introduction of industrial training; the manufacturer who sees commercial supremacy passing from the hands of America to technically trained nations; the educator who has begun to realize the inherent defects of an exclusively bookish school, and the workers themselves who are demanding an education suitable to their economic needs, but so safeguarded as not to menace the advantages gained through organization."

The main reason why we demand trade education for the old as well as the young is partly due to the inefficient apprenticeship system. The manufacturer is not expected to run his institution to teach trades, nor can he be justly criticised for specializing, when one takes into consideration the fact that he is working to a very definite end—the output. Under these extremely adverse conditions it is quite difficult for a young man to master a trade in an allotted period of time. He becomes part of a particular machine that requires time to learn; he turns out a good product; he becomes ambitious and desires to broaden his scope, but the foreman does not permit him to leave his machine because it takes time to learn another. In most cases the ambitious lad looks for a new position in the hope of being able to earn more, and so he goes from one shop to another stealing his trade. On the other hand it is the manufacturers' fault when he complains that skilled mechanics are scarce. Then again the argument is found that certain men become so proficient in certain lines, and put so much individuality into their work, especially in the furniture industry that they prefer, and even insist in being permitted to remain at that particular work.

Comparing the prospects of the boy who learns his trade in the shop, and the boy who learns it in the trade school it is to be plainly seen that the former reaches a certain wage and does not get beyond that, while the latter continues to develop his capacity indefinitely.

There is no question but that the trade schools and that industrial education in the public schools has proven inadequate from an industrial point of view. It is quite impossible for a young man or a young

woman to teach the rudiments of any trade from the fact that they have not learned to master the technicalities which are bound to arise in any shop. It is an easy matter to teach theory; to teach one to familiarize himself with the technical terms, but unless the instructor has the shop in which to work out and demonstrate his theories or let the students work them out for their own benefit, little success or benefit can be derived. Manual training classes, well devised to encourage the student to work at various branches until he is satisfied he is fitted to follow some particular vocation, is the only benefit that can be obtained from such an institution.

A young man who had spent considerable time at his father's furniture factory during vacation returned to his manual training class in the high school, where a young woman teacher was trying to demonstrate some points in the industry. The young man had some excellent instruction at the factory, and when the teacher insisted upon him doing the work her way he revolted and left the class. The plan as worked out in the Fitchburg High School is correct in principle. There the school teaches the theory, and then sends the boys into the shop for actual training, and it comes nearest to an ideal trade education.

When one takes into consideration the possibilities of a student in a manual training school, preparing himself say, for the wood industry such as a furniture factory, he finds a problem before him. The boy who spends his time studying the technical sides, devoting much time and working and designing by hand at the bench, is not qualified for factory work, by reason of the fact that variance and character do not correspond with that of the factory, therefore, in most cases, industrial training only places him in the position to determine which course he shall follow. The average boy who is fortunate enough to gain a fair knowledge of its various branches seldom pursues his vocation at the bench, but rather seeks the theoretical side, and looks for an office position, which he is not capable of holding and, indeed, seldom gets. On the other hand, the boy who has discovered by instruction the work cut out for him who applies all his energies and talents to the task, will be greatly benefitted in a manual training class or trade school. Here is where he lays his foundation for the future, and here is the place where he learns the first rudiments of the trade and the proper handling of tools; and when he goes into the shop to take up his apprenticeship he lays out his course of action and applies himself to study as well as actually working out the practical and theoretical points pertaining thereto.

Industrial education could be carried on in all branches of trades, and in co-operation with high schools and universities if only carried on in the spirit it should be, and not for greed and selfishness of the few who wish to profit by taking advantage of the half-trained men, for their own personal aggrandizement.

Belts for Woodworking Machinery

Belts employed in the operation of woodworking and finishing machinery are exposed to more severe atmosphere conditions than the common belt. Ordinarily the running belts are confined within apartments in mills or shops, where there is a fair protection for them; but in the lumber working interests one may find belting running in the open, conveying power from an engine which may be established in the woods to the lumber cutting machinery also not sheltered except, perhaps, for a crude roof thrown up over them. The belts of exterior lumber cutting service are subjected to the rains, the sun and the dust. These three factors combine to ruin a belt in a few months, unless precautions are taken to overcome some of the troubles. There is often considerable building of sheltered passages for belts in the fixed plant; but when the sawing plant is of the portable character there is not much time or material wasted in erecting covered ways for belts. The belts have to take the pelting of the rains and the baking of the sun. Therefore, belts of lumber working yards are likely to have numerous defects in them.

In Fig. 1 herein is shown the manner in which an exposed belt usually breaks up. The constant heating, drying, wetting and chafing of the uncovered leather results in hardening and cracking along the edge as at A. Of course, lubricants can be applied to soften the leather, and these will impregnate the fiber and help to some degree, but even the oils become noneffective as time passes and dust gathers in quantities on the surface. The dust hardens and is worn down to a smooth gloss on the wheels and the surfaces of the belting. When a belt gets to the stage shown in Fig. 1 it is time to substitute a new one. The chances are that the new one will go to pieces the same way, in time. In order to overcome this danger a covered passageway can be erected at small cost and in a short time to prevent the elements from ruining the belt.

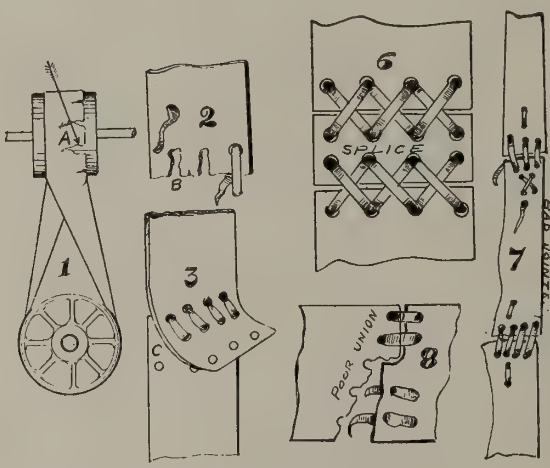
It is becoming more and more common to use covered ways for running belts in lumber yards. In some cases the portable plants are provided with adjustable sheet metal runways through which the belt may be passed when the outfit is set up. The exposed belt decays rapidly at the joints, so that in time the holes may pull out as shown at B, Fig. 2. When the holes break out in this manner the end must be clipped off to present a fresh surface; then the holes pull out again and once more a piece is cut off, which takes some of the leather out each time and makes the belt shorter, and a piece must be spliced in. The exposed belt of the lumber yard is liable to break apart at the joints, as at C., Fig. 3, because of loosening of the cementing stuffs resulting from moisture on them. In order to prevent the joint from severing entirely a row of lacing is put in, as shown. Strenuous efforts are made to make the unions hold under adverse conditions. Fig. 4 shows how one man introduced a triple system of lacing. He punched six rows of holes and laced the centre with the double twist type of lacing. This distribution of laces would make a firm grip under ordinary conditions; but when a belt is in a weakened condition through moisture and general exposure the rotting leather will pull out at the holes regardless of the system of distribution of the laces.

The system of lacing shown in Fig. 5 is somewhat elaborate. The workman had experienced trouble with the belt breaking at the joint. He had adopted several methods for completing a joint, still the laces pulled out or the ends of the belt tore off. Then he devoted considerable time to the complicated belt sewing illustrated. He put in his series of holes, all close to-

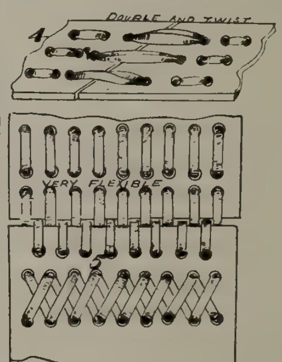
gether, as will be observed. When he got to the middle lacings he arranged the laces to fit alternately above and below the joint, thereby making a most pliable union.

Fig. 6 is given to show one way employed by the mechanics of a certain lumbering establishment of making a union with a splice piece inserted. It will be noticed that the crosses are confined to one side. Often in inserting a piece in a belt to make up for the bad ends that have been clipped off, the laces are made straight and crossed on the same side. This mixture of straight and crossed laces always develops trouble.

In Fig. 7 is shown the kind of belt that should be avoided, for the reason that it is patched and remade in places. In case a belt has to be used after it is patched a number of times pains should be taken to have the joints cut evenly and laced. If the splice is uniformly made it should not hinder the run of the belt; but if the spilces are poorly made, as in this figure, the belt will give endless trouble. Belts in use on struggling machines like this are sure to militate against the performance of good work.* Often belts on importtant machinery in lumber yards operate in as bad condition as shown in Fig. 8. In case a belt thus united has much work to do, the strain will quickly tear open the union; but if the work is light the patched joint may run on indefinitely, but giving poor service.



Methods of Mending and Splicing Belts



An Elaborate Mend

A study has been made by the Forest Service of a number of different species of wood to determine the specific gravity of the actual wood substance. Results obtained thus far show it to be from 1.5 to 1.6, the variation among species being comparatively small.

Knots are broken or chipped out around the edges, grain is torn, especially along the edges, and all together, the manufacture is bad. All on account of the fact that the knives don't cut at the right angle, and they are not kept as keen as they should be.

The planing machine of high capacity, while at work, is not the only one with money-saving possibilities. When it comes to moulders and sticker that have to be changed often during the day, one with facilities for making quick changes is essential to economical work.

Good Advice

Speed is not the only quality required of a planer, but the new high speed planers seem to do a better quality of work as well as more of it.

When a full-grown man gets to acting like a spoiled kid, it makes a fellow long for some kind of a patent spanking machine to fit such needs.

The noiseless chain drive on machine-cut sprockets is taking some of the work away from the gear drives on machines, and is making a good job of it, too.

Plain oak in office furniture has been finished off to look so good that it makes one wonder if about the next thing will be a run in fine, plain oak furniture.

The workman that reads and studies may have just as much trouble first and last as the one that does not, but it will be different kind of trouble further along the road of progress, for the man that reads and thinks generally moves along.

Many a man claims faith in old-fashioned things merely by way of excuse for being stubborn about taking up with new offerings.

The operator who is always grumbling about the shortcomings of his machine generally has a few shortcomings of his own that could be grumbled about.

At times it looks to a man up a tree like it is easier to be an efficiency expert than it is to be a good machine hand, and it is really good machine hands that are needed most.

If a man breaks the leg of a machine, he gets a cussing, and the boss pays for it; if he breaks his own leg, he gets visited by a shyster lawyer—and the boss pays for it.

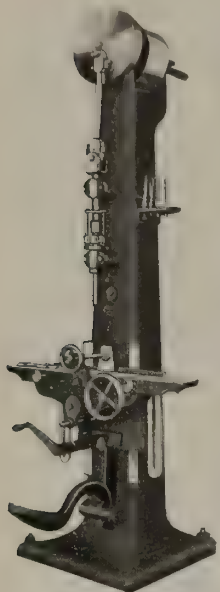
The boss is working for himself when he hires a man, and the man is working for himself as well as the boss all the time he is on the job. This is a point that too many fail to grasp well.

If every man built every piece of furniture as if he were going to keep it himself, there would be very few complaints and fewer yet of the pieces sent back on account of poor workmanship.

The band rip-saw only saves a little bit of kerf at a time, as compared to the circle saw; but if it is busy, it cuts a whole lot of times in the course of a year, and these little bits total up considerably.

New design of Power Mortiser

We illustrate herewith a new design of power mortiser (No. 505) manufactured by the Canada Machinery Corporation, Limited, of Galt, Ont., which will appeal to those who are looking for a strong serviceable machine. The frame is cast in one piece and is of sufficient width and strength for all ordinary work. It has a cored base made in such a manner as to set rigidly on the floor and is a great improvement over the old style flat based machines. The table is long and compound, and is adjustable to and from the chisel to suit the position of the mortise. It can also be adjusted for angle mortising and will drop 12 in. and mortise to the centre of 6 inches. The table is brought up to the chisel by a foot treadle, thus reducing the strain on the chisel spindle. The treadle is compounded and the table can be raised or lowered with the minimum pressure. The connecting rods are made of steel with brass bushing and steel crank pin. The spindle is supplied with automatic spindle guide and chisel reverser, which holds the spindle in position without the use of keys or set screws and reverses the chisel by the action of the table in its downward travel. Each machine is furnished with six chisels, viz., 5-16 in., ⅜ in., 7-16 in., ½ in., ⅝ in., and ¾ in.



Friction Losses Due to not Keeping Shafting in Line are Inexcusable

When a line shaft is originally erected, it is presumably straight and true, and the hangers and bearings by which it is supported are, or should be, accurately aligned and firmly secured. It is unfortunately true, however, that few such installations are permitted to remain in the correct relations in which they have been placed. Variations in loading upon floors, settlement of piers, unequal belt stresses, burden or pulleys and especially frequent disconnections and reconnections, combine to affect the truth of the whole and to prevent it from keeping in line.

Under such circumstances, it is essential that the properly designed transmission system should include ample opportunity for self-adjustment and for local correction. The fundamental requirement of a satisfactory journal bearing is that it shall be truly in line with the shaft itself. This includes some form of freedom of movement, such as is given by a ball-and-socket support, permitting a small amount of oscillation in any direction to conform to the direction of the axis of the shaft. Such an adjustment is well recognized as an essential to every well designed hanger; but too often it consists merely of a sort of looseness which permits wobbling in any way, and does not provide really proper support. A true ball-and-socket units firmness with adaptability and is self-adjusting, so far as variation in direction is concerned. It usually gives entire satisfaction.

The question of lubrication has been met in a number of ways, and the so-called self-lubricating bearings require so little attention that this point may be considered as wholly solved.

Modern Machinery and Safety Devices

A catalogue recently received from the C. O. Porter Manufacturing Company, Grand Rapids, Michigan, shows the wide range of products turned out by them. This includes jointers, lathes, planers, saws, etc., as well as safety devices. We illustrate herewith their No-Kick-Back Saw Guard, which is endorsed by factory inspectors and liability companies.

The Porter "No-Kick-Back" prevents stock from kicking back and keeps it from bunching and binding on the saw. It also prevents the sawdust from flying into the operator's eyes.

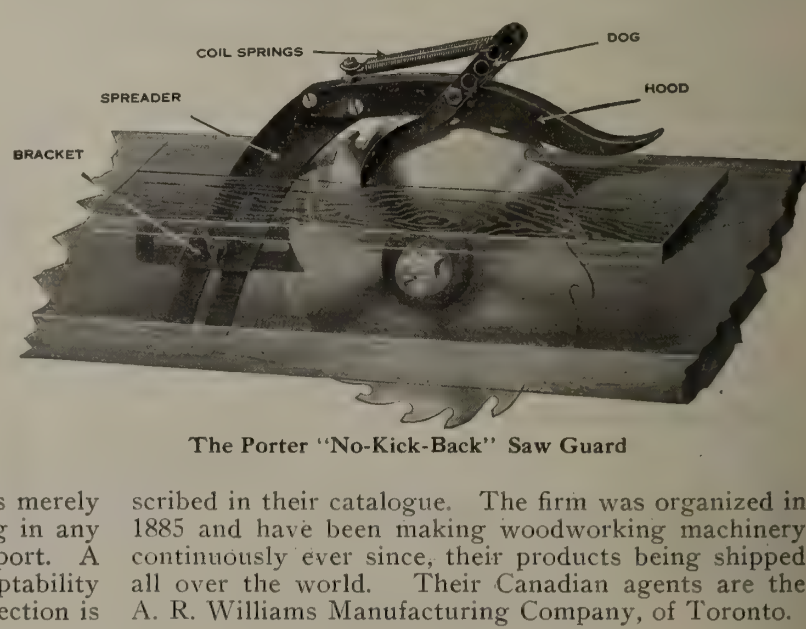
The steel dogs, which swing on a stud, take hold of the stock at the first tendency to come back. This is made positive by using the coil springs, which are always at a tension. The greater the tendency to fly back, the more the dogs grip the wood. This feature is entirely new on a guard saw and we understand is used on the Porter Guard only. It is a most essential feature on a saw guard, as many fatal accidents have been caused by stock kicking back and striking the operator.

The spreader, which is directly in the rear of the saw, is made of tool steel of a thickness to conform to that of the average saw and is slotted to allow for different sizes of saws.

The hood, which is made of cast iron, is fastened to the spreaders with two bolts; if it is desired to tilt the hood up so as to file without removing, it is necessary to remove only the inside bolt.

The bracket bolts to the table with two bolts and is adjustable, allowing for the different sizes and wear of the saw. The little clamp as shown is regularly furnished, but another is supplied when the bracket is to be used on the inside of the table or opposite to that shown in the cut.

Space does not permit of further description of the many excellent machines and devices manufactured by the Porter Company which are illustrated and described in their catalogue. The firm was organized in 1885 and have been making woodworking machinery continuously ever since, their products being shipped all over the world. Their Canadian agents are the A. R. Williams Manufacturing Company, of Toronto.



The Porter "No-Kick-Back" Saw Guard

The News—From Coast to Coast

A planing mill will be erected at Edgewood, B.C., by W. J. Banting.

Lafleur's lumber and planing mill, Englehart, Ontario, was recently destroyed by fire.

Samuel Knechtel, is contemplating the building of a $40,000 furniture factory at Redcliffe, Alta.

J. Arthur Doucet's sash and door factory of Grandes Piles, P.Q., was recently damaged by fire.

The Kelsey Wheel Company, have awarded the contract for the erection of a $50,000 factory at Windsor, Ont.

The Canadian Wood Specialty Company, Limited, have increased their capital stock from $50,000 to $200,000.

Zeta & Johnston, planing mill owners, Fort Francis, Ont., have been succeeded by the Fort Francis Sash & Door Factory.

The Willis Piano Company will erect a $100,000 piano factory at St. Therese, Que. It will be three storeys, 100 x 150 feet.

The St. Romuald Hardwood Flooring Company, Limited, of St. Romuald, Que., has been organized with a capital stock of $40,000.

The Wood-Mosaic Company, Inc., of Albany, Indiana, are contemplating erecting a factory to cost $100,000 in Stratford, Ont.

The foundation has been laid for a $5,000 addition to the Malcolm, Souter Furniture Company, Barton street east, Hamilton.

A permit has been issued for the building of a $5,000 sash and door factory on William street, Winnipeg. The owners are Messrs. Nelson & Forster.

The capacity of the drying kiln of the Arnett Furniture Company, Limited, at Souris, Man., has been doubled, the kiln now accommodating three cars of 50,000 feet.

The saw mills, planing mills, and storehouse and a quantity of lumber valued at $125,000, belonging to the Fassett Lumber Company, of Fassett, Que., were recently totally destroyed by fire.

Amherst Pianos Limited, of Amherst, N.S., are installing electric motor drives in their new factory. Motors will be direct connected to tools. Current will be furnished by the Canada Electric Company.

The new sash and door factory of the Canadian Western Lumber Company, at Westminster, B.C., is now in operation. The daily output of this mill at present is in the neighborhood of 1,000 sashes and doors.

The Elmira Furniture Company, Limited, of Elmira, Ont., are now erecting an addition to their plant which will be 100 x 50 feet, brick, three storeys high. When this addition is completed their output will be doubled.

The Beaver Lumber Company, Limited, have been organized with a capital stock of $75,000. The head office will be in Toronto. The charter permits of their engaging in the planing mill and woodenware manufacturing business.

The Preston Chair Company, Limited, has been organized with a capital stock of $100,000. Their chief place of business will be Preston, Ont., and the company will manufacture all kinds of chairs and furniture of a kindred nature.

At the closing exercises of the Technical School at Quebec, Sir Lomer Gouin, the Premier, stated that, in addition to the technical schools in Montreal, Quebec, and Shawinigan, other technical schools would be built in different parts of the province. He also hoped to see other branches of instruction given, especially wood carving.

The Farnham Wood Manufacturing Company, Limited, has been organized with a capital stock of $200,000. Their chief place of business will be Montreal. Their charter permits of their carrying on a general wood-working and carriage making business.

Sarrasin & Fils recently suffered a loss of some $45,000 when their sash and door factory on Duvernay street, Montreal, was destroyed by fire. Up to the time of going to press no information could be received as to whether or not the firm intends to rebuild. Four firemen were killed at the fire.

J. & W. Duncan, Limited, are constructing a new planing mill at 1833 Ontario street, Montreal, to replace the one burned last Fall. It will consist of two storeys and will be constructed on a site 110 x 75. The foundations will be of concrete, the building of solid brick, the floors will be of spruce and the roof of felt and gravel. An engine of 150 h.p. will be installed together with nine wood-working machines.

The Edgewood Lumber Company, Castlegar, whose mill was destroyed by fire last April report that it has been rebuilt and put into operation with full equipment, as follows: A No. 90 Berlin planer and lather. A No. 108 Berlin moulder. A No. 341 Berlin band re-saw. A No. 258 Berlin self-feeding rip saw, together with all the necessary filing room material.

It is reported that the Escabana Veneer Mills Company will not rebuild their plant, which was recently destroyed by fire, at Sutton, Que., but intend erecting a mill about two miles east of Glen Sutton. The big item of hauling the logs to the station would thus be avoided and the mill would be nearer the source of supply of their hardwood timber, which is mostly cut in that section.

The Malone Moulding & Framing Company, have their new factory at No. 8 Beaver Hall Hill well under way. It will be two storeys 25 ft. x 75 ft., cement foundation, mill construction, felt and gravel roof. It will be fitted with electric light and hot water heating. The company are in the market for a rip saw, sticker, and shaper. Also a supply of ash and basswood suitable for picture frames.

The Moncton Woodworking Company, although it has only been organized about three months, is flooded with orders and the plant is running at its fullest capacity. The stock manufactured is principally a line of builders supplies such as, ordinary lumber, clap-boards, moulding, sheathing, door and window frames, etc., although cabinet making is also to some extent carried on. At present the firm employs about twenty-eight men, but expect to extend their factory this Fall in order to cope with their rapidly growing busi-

by shavings and refuse from the mill. By an ingenious arrangement of pipes and fans the saw dust and shavings are carried from all parts of the mill to the fire box door. There is also an arrangement whereby a dynamo may be used to supply light for the mill and offices. The company expect to shortly install natural gas for heating the boilers, of which there are two. Mr. Brenton, the manager, states that judging from present indications the business done by the firm will aggregate more than $50,000 for their first year.

New Branch in Forestry Department

The staining of woods for ornamental purposes has been a common practice for ages. In many instances a cheap inferior wood is stained and finished to imitate a more costly wood, but as long as the result is pleasing to the eye and purse no harm is done, provided, of course, that the wood is sold as a substitute and at the price of a substitute.

For purposes other than ornamental, where the actual values of a wood depends on its structure more than its appearance, this substitution becomes more important. In the majority of cases the purchaser is familiar with the appearance of the wood he uses and can detect substitutes. But even the expert practical man is not infallible. There are many kinds of wood that cannot be distinguished from one another without the aid of a microscope. The forestry branch of the Department of the Interior at Ottawa is undertaking study of the commercial woods of Canada and their identification, and a laboratory is being equipped for this work. Enquiries are frequently received from wood-users concerning the identity of different kinds of wood, and preparations are being made to handle this class of work efficiently.

Some woods can be distinguished by the examination of comparatively small samples; with others more material is required, pieces showing both sapwood and heartwood being needed in some cases. The more information that can be submitted with each sample the easier its identification will be. It should be borne in mind that it is sometimes impossible by any known means to distinguish certain kinds of wood, by their structure alone. With others it is a comparatively simple matter, and the separation can be carried out to different species of the same tree. It is expected that this new branch of study will be of considerable benefit to wood users in Canada.

Keep Thin Knives Keen

Operators will find that there is no economy in running their thin knives too long without grinding. Repeated jointing forms a heavy heel on thin knives that not only prevents the best surfacing being done but requires so much grinding to keen the knives that altogether too much steel is wasted in the operation.

Considerable tearing out and generally poor work is ascribable to too much heel. No dull knife can do good work even though there is tremendous power back of it. So keep your thin knives keen, even though you are advised occasionally by a practical man that frequent grinding is unnecessary.

It is probably as well to say right here that to keep thin knives keen, except under the heaviest work, or work on gritty or hardwoods, it is seldom necessary to grind them daily. Probably every other day is frequently enough.

A system that has the approval of the best informed men, is to grind the top and bottom heads on alternate days. Changes of side and profile heads will have, in every case, to govern the frequency of grinding. Good judgment is needed in the care of thin knives, as well as in any operation in the mill.

BUYER'S DIRECTORY

AUTOMATIC DOVETAIL GLUE JOINTER
Canadian Linderman Machine Co., Ltd., Woodstock, Ont.

AUTOMATIC GLUE CLAMP CARRIER
Nels J. Billstrom, 1315 Tenth street, Rockford, Ill.

BABBITT METALS
Shurly Dietrich Co., Ltd., Galt, Ont.
Fay & Egan Co., Cincinnati, O.
Canada Metal Co., Ltd., Toronto.

BALUSTER LATHES
C. Mattison Machine Works, Beliot, Wis.
Thos. White & Sons, Paisley, Scotland.
Chicago Machinery Exchange, Chicago, Ill.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.
Canada Machinery Corp., Ltd., Galt, Ont.

BAND SAW FILING MACHINERY
Shurly Dietrich Co., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

BAND SAWS
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Shurly Dietrich Co., Ltd., Galt, Ont.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
R. H. Smith Co., Ltd., St. Catharines, Ont.

BAND SAW MACHINERY
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
H. W. Petrie, Ltd., Toronto.

BAND SAW MILLS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., Cincinnati, Ohio.

BAND SAW STRETCHERS
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

BENDING MACHINES
Fay & Egan Co., Cincinnati, Ohio.

BELTING
J. A. Fay & Egan Co., Cincinnati, Ohio.
Sadler & Haworth, Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
H. W. Petrie, Ltd., Toronto.

BELTS (Endless)
Candada Machinery Agency, Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Sadler & Haworth, Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
H. W. Petrie, Ltd., Toronto.

BELT CEMENT
Sadler & Haworth, Montreal.

BELT FASTENERS
Sadler & Haworth, Montreal.

BELT DRESSING
Sadler & Haworth, Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

BLOWERS
Sheldons Limited, Galt, Ont.
H. W. Petrie, Ltd., Toronto.

BLOW PIPING
Cyclone Blow Pipe Company.
Sheldons Limited, Galt, Ont.

BOILERS
Canada Machinery Agency, Montreal.
H. W. Petrie, Limited. Toronto.

BORING MACHINES
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Mussens, Limited, Montreal.
J. M. Nash, Milwaukee, Wis.
Valley City Machine Works, Grand Rapids. Mich.
H. W. Petrie, Limited, Toronto.

BOX MAKERS' MACHINERY
Canadian Linderman Co., Ltd.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.

BROKEN CASTINGS BRAZED—MACHINIST AND DIE MAKER
W. H. Dunne, 1492 Queen St. West, Toronto.

CABINET PLANERS
Canada Machinery Corporation, Ltd., Galt, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Agency, Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Valley City Machine Works, Grand Rapids, Mich.
Baxter D. Whitney & Son, Wichendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Ltd., Toronto.

CARS (transfer)
Sheldons Limited, Galt, Ont.

CARVING MACHINES
Canada Machinery Corporation, Ltd., Galt, Ont.
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Hespeler Machinery Co., Ltd., Hespeler, Ont.
Valley City Machine Works, Grand Rapids, Mich.

CHISELS
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

CIRCULAR SAW MILLS
Canada Machinery Agency, Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
H. W. Petrie, Limited, Toronto

CHAINS (Silent)
Jones & Glassco, Montreal

CLAMPS (Chain, Carpenter, Cabinet, Pattern Makers, Bench, Mitre, Piling, Mounted and Rotary Wheel)
Batavia Clamp Company, Batavia, N.Y.
Black Bros. Machinery Co., Mindota, Ill.
J. A. Fay & Egan Co., Cincinnati, Ont.

CLAMPS (Saw)
Shurly Dietrich Co., Ltd., Galt, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

CLUTCHES
J. A. Fay & Egan Co., Cincinnati, Ohio.

COLUMN CLAMPS
Black Bros. Machinery Co., Mendota, Ill.

COLUMN MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.

CORE BOX MACHINES
J. A. Fay & Egan Co., Cincinnati, Ohio.
Chicago Machinery Exchange, Chicago, Ill.
E. & B. Holmes Machinery Co., Buffalo, N.Y.

CUT-OFF SAWS
Canada Machinery Corporation Ltd., Galt, Ont.
Shurly Dietrich Co., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Berlin Machine Works, Ltd., Hamilton, Ont.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

CUTTER HEADS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Lamson Cutter Head Company.
Samuel J. Shimer & Sons, Milton, Pa.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

DADO HEADS
C. Mattison Machine Works, Beloit, Wis.
Fox Machine Company, Grand Rapids, Mich.
W. A. Elliott, Bathurst and College Sts., Toronto.

DIEMAKERS & MACHINISTS
W. H. Dunne, 1492 Queen St. West, Toronto.

DISK GRINDERS
J. A. Fay & Egan Co., Cincinnati, Ohio.

DOGS (Saw Mill)
J. A. Fay & Egan Co., Cincinnati, Ohio.

DOVETAILING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canadian Linderman Machine Co., Ltd., Woodstock, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

DOWEL MACHINES
Thos. White & Sons, Paisley, Scotland.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Dauber-Bell Machine Company.
J .A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Valley City Machine Works, Grand Rapids, Mich.

DRYING MACHINERY
Sheldons Limited, Galt, Ont.
Morton Dry Kiln Co., Chicago, Ill.

DRY KILNS
Sheldons Limited, Galt, Ont.
Morton Dry Kiln Company, Chicago, Ill.

DUST COLLECTORS
Sheldons Limited, Galt, Ont.

DUST SEPARATORS
Sheldons, Limited, Galt, Ont.

EDGERS (Gang)
Berlin Machinery Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

EDGERS (Single Saw)
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Agency, Montreal.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

END MATCHING MACHINE
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

ENGINES (Steam)
H. W. Petrie, Limited, Toronto.

EXHAUST FANS
Sheldons, Limited, Galt, Ont.

FLOORING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corporation, Ltd., Galt, Ont.
Baxter D. Whitney & Son, Winchendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

FLINT
Wausau Quartz Co., Wausau.

FLUTING HEADS
J. A. Fay & Egan Co., Cincinnati, Ohio.

FLUTING AND TWIST MACHINE
Pryibil Machine Co., P., New York.

GAINING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Canada Machinery Corporation, Ltd., Galt, Ont.
H. W. Petrie, Limited, Toronto.

GAS ENGINES
H. W. Petrie, Limited, Toronto.

GAUGES (Saw)
Shurly Dietrich Co., Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver B. C.

GLUE CLAMPS
Batavia Clamp Company, Batavia, N.Y.
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.

GLUE HEATERS
J. A. Fay & Egan Co., Cincinnati, Ohio.

GLUE JOINTERS
Canada Machinery Corporation, Ltd., Galt, Ont.
Canadian Linderman Company, Limited, Woodstock, Ont.
Chicago Machinery Exchange, Chicago, Ill.

GLUE SPREADERS
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

GRINDERS (Cutter)
J. A. Fay & Egan Co., Cincinnati, Ohio.

GRINDERS (Knife, etc.)
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

GRINDERS (Tool)
J. A. Fay & Egan Co., Cincinnati, Ohio.
Valley City Machine Works, Grand Rapids, Mich.

GROOVING HEADS
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Samuel J. Shimer & Sons, Milton, Pa.
Canada Machinery Corporation, Ltd., Galt, Ont.

HAND PROTECTORS
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Jones Safety Device Co., Hamilton, Ont.

HAND SCREWS
Black Bros. Machinery Co., Mendota, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

HEATING APPARATUS
Sheldons, Limited, Galt, Ont.

HANDLE AND SPOKE MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
J. M. Nash, Milwaukee, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.

HUB MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

HYDRAULIC VENEER PRESSES
Wm. R. Perrin & Co., Ltd., Toronto.

INJECTORS
H. W. Petrie, Limited, Toronto.

JOINTERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canadian Linderman Co., Ltd., Woodstock, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Plessisville Foundry, Plessisville, Que.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

KNIFE GRINDERS
Rogers & Coampany, Samuel C.

KNIVES (Planers and Others)
Shurly Dietrich Co., Ltd., Galt, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Samuel J. Shimer & Sons, Milton, Pa.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
H. W. Petrie, Limited, Toronto.

LACE LEATHER
Sadler & Haworth, Montreal.

LATHES (Pattern Makers')
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Valley City Machine Works, Grand Rapids, Mich.
H. W. Petrie, Limited, Toronto.
Thos. White & Sons, Paisley, Scotland.

LATHES (Turning)
Berlin Machine Works, Lid., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Valley City Machine Works, Grand Rapids, Mich.
Baxter D. Whitney & Son, Winchendon, Mass.
H. W. Petrie, Limited, Toronto.

LOOSE PULLEYS
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corporation, Ltd., Galt, Ont.

LUBRICANTS AND GREASES
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.

LUMBER
Anderson Lumber Company, C. G.
Elgie & Jarvis, Toronto.
Oliver Lumber Company, Toronto, Ont.

MACHINE KNIVES
Walters & Sons, H., Hull, Que.

MITRE MACHINES
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N. Y.
H. W. Petrie, Limited, Toronto.

MITRE SAWS
Shurly Dietrich Co., Ltd., Galt, Ont.
E. C. Atkins & Co., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corporation, Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

MITRE CLAMPS
Batavia Clamp Company, Batavia, N.Y.
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.

MORTISING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Jones & Glassco, Montreal.
Valley City Machine Works, Grand Rapids, Mich.
H. W. Petrie, Limited, Toronto.

MOTORS
J. A. Fay & Egan Co., Cincinnati, Ohio.

MULTIPLE BOXING MACHINES
J. A. Fay & Egan Co., Cincinnati, Ohio.
J. M. Nash, Milwaukee, Wis.

PACKINGS
Both Felt Company

PAINTS AND VARNISHES
Jamieson & Co., R. C., Montreal.

PATTERN SHOP MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y
H. W. Petrie, Limited, Toronto.

PICTURE FRAME MACHINERY
Black Bros. Machinery Co., Mendota, Ill.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.

PLANES
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corp., Ltd., Galt, Ont.

PLANERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.
Porter Mach. Co., C. O., Grand Rapids, Mich.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

PLANING MILL MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Chicago Machinery Exchange, Chicago, Ill.
C. Mattison Machine Works, Beloit, Wis.
Pryibil Machine Co., P., New York, N.Y.
Samuel J. Shimer & Sons, Milton, Pa.
Baxter D. Whitney & Son, Winchendon, Mass.
Black Bros. Machinery Co., Mendota, Ill.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie Co., Ltd., Toronto.

POLISHING MATERIAL
Gray & Company, H.

PULLEYS
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

RESAWS
Shurly Dietrich Co., Ltd., Galt, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

RESAWS
H. W. Petrie, Limited, Toronto.

RIM AND FELLOE MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corp., Ltd., Galt, Ont.

RIP SAWING MACHINES
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Canada Machinery Corp., Ltd., Galt, Ont.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

SAFETY GUARDS (For Band Saw Machines, Jointers, Rip Sawing Machines, Shapers, Swing Saws, etc.)
Chicago Machinery Exchange, Chicago, Ill.
Fair Manufacturing Company, Racine, Wis.
Jones Safety Device Co., Hamilton, Ont.

SANDERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
J. M. Nash, Milwaukee, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Fisher Sander Co., Berlin, Ont.
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.
Elliot Woodworker Co., Toronto.

SANDPAPER
Black Bros. Machinery Co., Mendota, Ill.

SANDERS (Moulding, Belt and Panel)
Black Bros. Machinery Co., Mendota, Ill.
Chicago Machinery Exchange, Chicago, Ill.
H. W. Petrie, Ltd., Toronto.

SASH, DOOR INTERIOR TRIM AND COLUMNS
M. Brennan & Sons, Hamilton, Ont.

SASH, DOOR AND BLIND MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Samuel J. Shimer & Sons, Milton, Pa.
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.

SAWS (Hand)
Shurly Dietrich Co., Ltd., Galt, Ont.
E. C. Atkins & Co., Hamilton, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

SAW MILL MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
H. W. Petrie, Limited, Toronto.

SAW SWAGES, AUTOMATIC FILERS
E. C. Atkins & Co., Hamilton, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.

SAW TABLES
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

SCRAPING MACHINES
Baxter D. Whitney & Son, Winchendon, Mass.
Chicago Machinery Exchange, Chicago, Ill.

SCROLL SAWS
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Shurly Dietrich Co., Ltd., Galt, Ont.
E. C. Atkins & Co., Hamilton, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.

SECOND HAND MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
H. W. Petrie, Limited, Toronto.

SHAPERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Samuel J. Shimer & Sons, Milton, Pa.
Baxter D. Whitney & Son, Winchendon, Mass.
H. W. Petrie, Limited, Toronto.

SHAVING COLLECTORS
Ormsby Company, A. B., Toronto.
Sheldons, Limited, Galt, Ont.

SINGLE SPINDLE BOXING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.

STAVE SAWING MACHINE
Baxter D. Whitney & Son, Winchendon, Mass.

STORE FIXTURES, FITTINGS
Reflector & Hardware Specialty Mfg. Co. Chicago, Ill.

SURFACERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.
Chicago Machinery Exchangefi, Chicago, Ill.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

SWING SAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

TABLE LEG LATHES
Berlin Machine Works, Ltd., Hamilton ,Ont.
Chicago Machinery Exchange, Chicago, Ill.
Thos. White & Sons, Paisley, Scotland.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.

TENONING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
H. W. Petrie, Limited, Toronto.

TOOLS (Hand)
J. A. Fay & Egan Co., Cincinnati, Ohio.
Samuel J. Shimer & Sons, Milton, Pa.

TRIMMERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

TRUCKS
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Sheldons, Limited, Galt, Ont.

TURNING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.
H. W. Petrie, Limited, Toronto.

UNDER-CUT SELF-FEEDING FACE PLANER
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.

GUMMERS, ETC.
E. C. Atkins & Co., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

UNIVERSAL WOODWORKER PLANER
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
W. A. Elliot, Bathurst St., Toronto, Ont.
H. W. Petrie, Limited, Toronto.

VENTILATING APPARATUS
Sheldons, Limited, Galt, Ont.

VENEER DIERS
Sheldons, Limited, Galt, Ont.

VENEER PRESSES (Hand and Power)
Hydraulic Press Mfg. Co., Mount Gilead, Ohio.
Black Bros. Machinery Co., Mendota, Ill.
William R. Perrin & Company, Toronto, Ont.

VISES (Band Saws)
Shurly Dietrich Co., Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
H. W. Petrie, Limited, Toronto.

VISES (Pattern Makers')
J. A. Fay & Egan Co., Cincinnati, Ohio.

VISES (Circular Saws)
E. C. Atkins Co., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
H. W. Petrie, Limited, Toronto.

WAGON AND CARRIAGE MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.

WASHERS
Booth Felt Company

WASTE, COTTON
Gray & Company, H.

WIPING MATERIAL
Gray & Company, H.

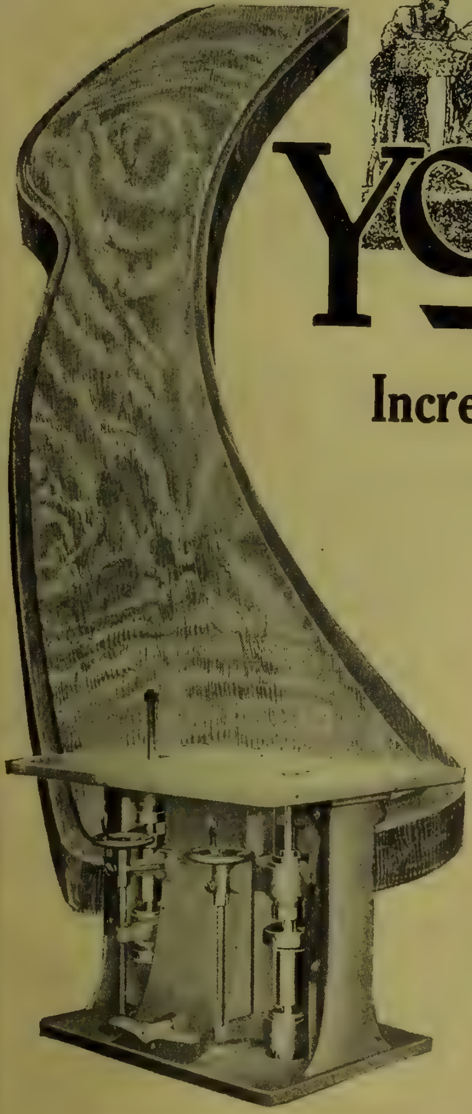
WINDOW FRAME MACHINERY
Smith & Phillips Mfg. Co., Chicago, Ill.

WOOD PULLEYS
Canada Machinery Agency, Montreal.

WORK BENCHES
Canada Machinery Agency, Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.

Volume Thirteen TORONTO, AUGUST, 1913 Number Eight

Canadian Woodworker



Canadian Woodworker

Canada's Only Woodworking Paper

Published in the interests of Planing Mills, Saw Mills, Furniture and Piano Factories, Implement and Carriage Works, Boxmakers and Coopers, Carpenters and Builders.

The Circulation extends from the Atlantic to the Pacific and covers thoroughly all classes of Woodworkers in this immense territory.

Wooodworker Publishing Co., Limited

Nicholls Building Toronto, Canada

MONTREAL - - - - - - - - - Board of Trade Building
NEW YORK - - - - - - - - - - Tribune Building
CHICAGO - - - - - - - - - - 659 Peoples Gas Bldg.
LONDON, ENG. - - - - - - - - 3 Regent Street, S.W.

SUBSCRIPTION RATE.

Canada, United States, $1.00; Great Britain, Australia 4s 6d.; other countries $1.50 per year. Advertising rates on request.

Vol. 14 August, 1913 No. 8

The Canadian Door Industry

WHY is it that the United States door manufacturer is able to invade the Canadian market to such an extent as to seriously handicap his Canadian rival, despite the fact that he has the duty to contend against? The Canadian door manufacturer is just as enterprising, efficient and up-to-date as his confreres in any part of the world, not excluding his United States rival. How is it then that the latter is able to successfully invade his market to such an extent?

First of all, with the enormous population of the United States, the market thus created is very much greater than that of the Canadian manufacturer and so enables our competitors across the border to build larger plants and thus decrease the cost of manufacture. It would be neither economy or good business, however, for Canadian manufacturers to emulate their United States rivals in the erection of mammoth plants of this nature, as it will be a great many years yet before our country has population enough to create the market for an output on such a wholesale scale.

Again, it is a well-known policy among United States manufacturers that they make the home market take care of the overhead expenses :They are thus able to sell their surplus in foreign markets at very little more than actual cost, in fact, the claim is made that they sometimes sell below cost.

Another fact that enables some United States manufacturers to undersell their Canadian competitors is that they employ child labor and consequently pay per capita in wages only a fraction of what the Canadian manufacturer has to pay his competent skilled adult help. This may largely account for the fact that doors made in the United States, or at all events the cheaper grades of them, are very much inferior to the Canadian product.

There are door plants in Canada now which are developing and growing, but not as rapidly as might be, on account of the uphill fight against unfair competition from the United States. What the Canadian door manufacturer requires is the maintenance of the duty on the imported product. Also, owing to reports that the United States article is being fradulently introduced in the Canadian market, it is essential that the customs exercise strict supervision over all material of this nature imported.

A Vacation Idea

It has long been an acknowledged fact that the men who work at the machines in the factory are just as much entitled to an annual vacation, with full pay, as the bookkeeper and clerks in the office. It is one thing to recognize this fact, however, and quite another to put into execution the idea of giving everybody a vacation. Many a business man has puzzled over this until he feels fretful towards the man who invented vacations. Yet to paraphase an old saying, there is always a way to be found where the will is strong enough and persistent enough, and every once in a while there is some new idea put into practice looking toward extending the vacation plan to include everybody about the place.

One idea in this connection that is being tried out now is the plan of starting modestly by giving to every man who has been at work for a year or more one day off with pay, and increasing this each year until it amounts to a full week. Perhaps in time it will extend to two weeks, and perhaps, on the other hand there are those who feel that this is a sort of stingy way of giving a man a vacation—just to make it one day. One day, however, is better than none, and the promise of adding other days, until, in the course of a few years, the man at the machine will have his vacation, just as the man at the books, makes it look like we are gradually working toward the right idea, even though there may be some objectionable features about the means adopted to reach the end.

You Will Get What You Give

You will receive returns from your business commensurate with what you put into it. The careless and the slip-shod; the slothful and the mentally lazy will get so far and no farther; they will be overwhelmed.

But he who is alert every minute; who takes time for thought; who is willing to study out the problems that confront him and who puts into his business the best that is in him, will surely receive the reward of his work.

The careers of conspicuously successful men prove beyond a doubt that nothing worth while can be accomplished without real labor, both mental and physical.

It is entirely apparent from the samples of furniture on exhibition in the market places, that there is to be a freer use of rattan in furniture making than in any recent period. Rattan, until recently, has been chiefly used in chair construction, the bodies of baby carriages and for chair seatings. With the larger production of white enamel furniture, considerable woven rattan began to be used in the ends and headboards of beds. Now has come its introduction, for ornamental purposes, in tables, stands, dressers and many other articles. Originally, the material was so used, and in chair seatings and backs was woven by hand, but machinery is now universally used, and the manufacturer of furniture can now buy rattan webbing as he would so much cloth or burlap. The outside coating of bamboo and other tropical growths is also being pressed into service for decorative work of many kinds. There seems to be a rage for this sort of thing this season.

Some of Stratford's Woodworking and Furniture Plants

IN the foremost rank among those middle-size cities of the Province of Ontario, which have attained a high position in the industrial, financial and commercial world, Stratford, the capital of Perth County, must be named and commended for its progressiveness in all lines of development. Chief among its industries are its woodworking factories, which, including the planing mills, number about six-

A Pair of Self Feed Band Saws in the Breaking Out Department.

teen. We have not the space to devote to a full description of all these plants, interesting although it would doubtless be to our readers, and are therefore only dealing with a few of the larger ones in this article.

The George McLagan Furniture Company, Limited, was first established in Stratford twenty-seven years ago under the style of "Porteous and McLagan," and took its present name in March, 1900, when the old factory was completely destroyed by fire. Eight months later the present mamoth plant was erected, Mr. George McLagan, becoming president and manager of the new concern. The factory consists of an imposing main building, 300 x 50 ft. with wing 160 x 60, four storeys high, with adjoining boiler and engine houses, a dry kiln with a capacity of 180,000 feet, an extensive dry lumber storage shed and other out buildings. It is connected with the Grand Trunk line by switches, which affords every advantage in receiving the raw material and shipping the finished article. The factory is one of the best equipped of its kind in Canada being fitted throughout with the most modern woodworking machinery for the production of high grade furniture of all kinds. Their specialties are dining room, hall and library furniture and cabinets for various uses, which are of the most exclusive designs and superb workmanship and are turned out mostly in quarter cut oak, birch and mahogany.

Employment is given to about 350 skilled workmen, for whose convenience every accommodation has been provided and every fireproof device employed. This firm does an extensive business with retail furniture dealers exclusively and has maintained an enviable reputation for high grade furniture which extends throughout the Dominion from coast to coast.

Mr. McLagan is still president of the company, but has given up the management of the factory to Mr. D. M. Wright. Mr. Chas. Farquharson is the secretary-treasurer of the company, and Mr. Fred G. Scrimgeour is the able and efficient superintendent.

The Lumber Yard

The lumber yard is laid out compactly in the most practical and efficient manner, the lumber coming into it from the firm's own siding. Transfer tracks are laid at regular intervals all through the yard for convenience in handling and stacking the lumber. The later is piled on cement piers which are arranged uni-

Rear View of Factory of The George McLagan Furniture Company.

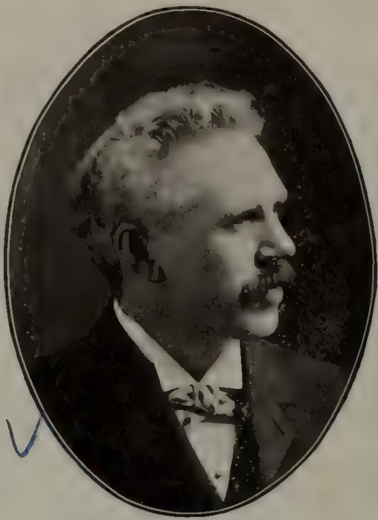
Views of the Plant of the George McLagan Furniture Company

Part of the Cabinet Department.

An Alley in the Lumber Yard, Showing Tracks and Lumber Piled on Piers.

Section of Machine Department.

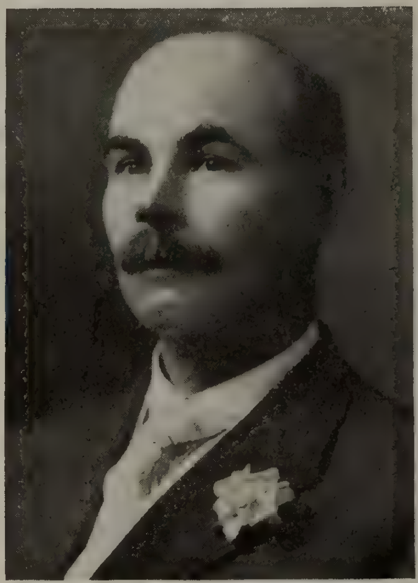
D. M. Wright, Manager



Geo. McLagan, President

H. S. Robertson, Sec. Treas.

Officers of The George McLagan Furniture Co. Limited Stratford, Ont.



Fred. E. Scrimgeour, Superintendent

Charles Farquharson

formly, thus keeping the yard in perfect order. The front piers are some inches higher than those in the rear, thus giving the lumber the proper slant for shedding rain. The yard is very extensive, the large space being found necessary as the company carries a big stock of lumber far enough in advance to be properly seasoned before putting in the kilns. In loading lumber for the kilns the kiln trucks are run on tracks on top of the transfer ones, the latter are then wheeled away to the piles and loaded up, the transfer truck being then wheeled back to the kiln and the kiln truck run off into the kiln.

The Kilns

The kilns are three in number, each with a capacity of about 60,000 feet. One of these kilns is the latest product of the Grand Rapids Veneer Company and is built of steel and concrete. The other two were made by the Standard Dry Kiln Company, of Indianapolis, Indiana. Adjoining the kilns is a large storage shed for the kiln-dried stock, which is an innovation which might be copied with profit by other firms in this line of business. This shed is 50 feet by 100 feet with a very high roof. In the winter or in damp weather it is warmed by a fan and a steam coil. The heat and moisture in the kilns are regulated by synchronizing instruments, under easy control of the operator.

Each kiln is supplied with a Bristol self-recording temperature thermometer, immediately below which are the hand wheels of the valves controlling the steam supply and which gives a very practical and easy control of the temperature. When dry the lumber is removed from the kilns and piled in the shed to temper, and from there is loaded on trucks and run to the saws as needed.

Roughing Out Department

The lumber comes into the factory direct to the five swing saws which cut it into the proper lengths. It then goes to the rip saws, four of which are hand feed roller top machines, two self-feed circulars, and two self-feed band rip saws. Two self-feed buzz plan-

ers, used for facing stuff true, one Herzog and one Falls under-cut machine are also to be found in this part of the factory. The use of these latter machines eliminates almost entirely the possibility of men getting cut or injured.

Machinery Department

In the machinery department there are two 12 in. moulders or stickers, one made by Ballantyne and the other by Rowley & Hermance. They have here one 30 in. Baxter D. Whitney & Son double surfacer planer and one Ballantyne 36 in. single surfacer. Stock comes into this department faced one side and edge and travels through planers and other machines, one of which is the double end tenoner, and various finishing saws, of which there are nine different types.

There are four double and two single spindle shapers, two being made by Jackson & Cochrane, two by Whitney, of Winchendon, Mass., and two by Cowan, of Galt. They also get good results from a 30 in.

Veneering Department

The veneering department is also in the new wing and is equipped with the latest type of veneering machinery and equipment, including a swing saw for cutting up large sheets of veneer, an 88 in. clipper and a ten-plate veneer re-drier. All of the above are made by the Merritt Manufacturing Company, of Lockport, N.Y. The Dennis veneer taping machine and the equipment of glue cookers and separators, made by the A. Francis Company, Rushville, Ind., are also to be found here as well as a 72 in. by 30 in. hydraulic press, manufactured by the A. Perrin Company, of Toronto. There are also a quantity of hand presses for various irregular and small work. In connection with the veneering room is a drying room heated by a fan and steam coil, into which stock is piled with sticks between to let the air through in order to remove all moisture. Stock is piled here as it leaves the press retainers.

Factory of the George McLagan Furniture Company.

Whitney scraper which gives a fine finish. Among the sanding machines was noted a Berlin endless bed sander. With this excellent machine one man can feed and two men will have all they can do to take away the material that passes through. It is used largely for handling the small stock, a three-drum machine of standard type being used for the heavier and wider stock.

There is a new wing to the factory 160 feet by 60 feet which was built in 1910. Here on the ground floor are located many band saws of various makes, four of which are going constantly. The turning lathes, carving machines and hand carvers are also located here, also the department for the carrying on of special work and the manufacture of samples. Two of the carving machines are four-cutter Moore machines, and one four-cutter was made by McLagan's themselves, the latter handling the irregular work which is held in centers. The special work and sample department has a set of machines for its own particular work, doing away with the interruption of the regular processes of stock work.

In the rear is a veneer shed and garage where some three or four cars are usually to be found and here also the company keeps rotary cut core stock and crossbanding veneers, which are bought in carload lots. This shed is 50 ft. by 60 ft.

Cabinet Department

The cabinet department is on the second floor in the old building and in the new wing as well. In this department there are several small sanding machines and belt polishers, there being three of the latter, viz., one Moore, one Clemens and one Fisher. There is also a trimming saw for convenience of the cabinet makers. All of the machines in this department are driven by a 20 h.p. motor. The small sanding machines are of the various kinds usually found in a furniture factory.

About fifty cabinet makers are employed in this department. After the goods are completed in this department they pass to the finishing room and here go through the usual processes, that is with the exception of what is kept in the white for special finishes,

and which is stocked on the fourth floor convenient to the fuming chambers. This firm handles a great deal of fumed stock though golden oak is their standard finish. The former is very popular just now and a great deal of furniture is made in designs to suit this particular finish. The stock-room is situated on the fourth floor and the finished goods are kept here for filling orders.

The Rubbing Room

As the stock-keeper picks out his goods they are sent to the rubbing room. Here are four pneumatic rubbers made by the Rockford Tool Company, of Rockford, Ill. After being rubbed the goods go to the polishers and then to the trimmers on the floor below. The trimmers put in the glass, brass hinges, locks, pulls, etc., see that the doors and drawers open and shut properly and that the furniture is ready in every way for sale or show window, without further cleaning on the part of the retailer. The goods next pass into the hands of the packers who crate them up. They are then sent down a slide to the shipping platform where they are loaded on cars at the firms own siding, that is if they are in carload lots. Smaller lots are teamed to the Grand Trunk station. The firm are putting up another freight shed to handle their rapidly increasing business, although the one at present frequently handles as many as seven cars at a time.

Power Plant

In the boiler room are two Goldie & McCulloch 130 h.p. boilers, the engine also being of this firm's manufacture. It is a Wheelock of 150 h.p. There is also a Leonard Ball engine of 60 h.p. These are supplemented by electric motors of 60 h.p. made by the Canadian General Electric Company, of Toronto. They are three in number and of 30, 20 and 10 h.p. respectively. The current is obtained from the Hydro-electric.

The factory and kilns are heated with the Webster Vacuum System, by means of which all condensation is returned to pumps and thence to the boiler. The steam, after doing its work through the engine, is all consumed in heating the factory and kilns, being supplemented in this work by live steam controlled by automatic valves. In the boiler and engine room there is also a machine repair shop which is fitted out with iron working machines and tools, so that the firm is enabled to not only do all its own repairing of machinery, but also to build small machines there. The machinery in this shop is motor driven.

Straight Sheraton Group, Side Table, China Cabinet, Buffet, Extension Table, Pedestal and Diners.

The factory is equipped with an automatic fire sprinkler system the practical use of which has been tested on more than one occasion. This system includes not only the main factory building but also the kilns, sheds and some of the out buildings.

For the quick location of heads of departments who may be scattered about throughout the factory, the plant is equipped with a system of Bell telephones and with the Auto-Call system, controlled from the main office by the telephone operator, consisting of twenty gongs scattered through the various parts of the factory and yards. By this system any head of a department can be reached at once no matter what portion of the plant he may be in at the time. Each foreman

has a number assigned to him which strikes upon the gongs when he is wanted.

The Bowser pump and tank system for handling certain finishing materials is installed, the tanks being kept under ground. A unique feature in connection with the factory is their large combined photographic studio and designing room, equipped with dark room, where they do all their own work, designing, photographing, developing, etc.

The Imperial Rattan Company, Limited, of Stratford, Ont., manufacture reed rattan and upholstered furniture and have upwards of 50,000 feet of floor space devoted to turning out high-class material in these

Factory of the Imperial Rattan Company.

lines. The upholstering of English style Chesterfield and easy chairs in tapestries and leather is a practically new venture but is proving a winner and will eventually crowd the concern into larger quarters. They make all their own frames and have a most complete wood-working plant containing Berlin revolving bed sanders, McKnight boring tools, sectional feed planers and self-feed rip saws. Tracks are laid from the dry kilns to the factory for convenience in bringing in material to be manufactured. All the machines are run by electric motors and about 125 hands are employed in the factory, most of this number being skilled workmen. The plant has all modern sanitary conveniences and is counted one of the most progressive business institutions in Stratford.

The Stratford Manufacturing Company make verandah and lawn furniture of all kinds, including lawn swings, suspended verandah seats, ladders and folding chairs and tables and woodenware, and have been awarded medals and diplomas in all the principal Canadian exhibitions. The enterprise was started in 1908 by the present company and is located on College Street, having its own siding connection with the Grand Trunk Railway. The plant has been added to and remodeled from time to time until now it covers an acre of land and is thoroughly equipped throughout with modern appliances. Only the highest grade materials are used and the product is put together by skilled mechanics of whom there are about thirty-five employed. Allan P. Boyer, is president of the company, C. A. Moore, manager, and E. Delemarter, superintendent.

Twelve of the machines which are in use in the plant were made by the firm themselves. These are specially fitted for use in making of ladders and boring. The ladders are made of yellow pine with rungs of rock elm.

Some of the other machines in use downstairs are shapers, made by the Advance Machinery Company, of Toledo, Ohio, and two rod machines made by the Hawker Company, of Dayton, Ohio. The machine shop, assembly room and iron shop are also on the ground floor, the latter being fitted out with drills made by the Barnes-Crocker Company, of Rockford, Ill.

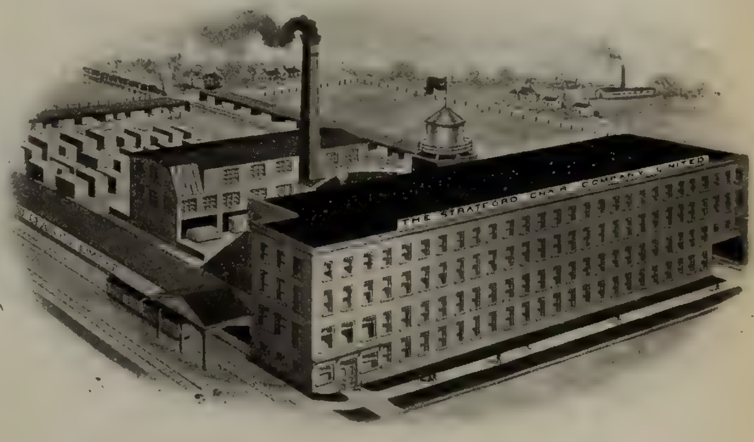
The paint shop is adjoining the machine shop and in it are two tanks 8 ft. in depth for dipping purposes and also four smaller ones. The firm has a large storage shed where lumber is kept under cover. This shed is of galvanized iron and is 140 ft. x 75 ft. The shipping room on the second floor and near the sloping platform running down to the cars.

The offices, assembly and sanding departments are on the second floor, the latter being fitted with sanders made by J. M. Nash, of Milwaukee, Wis. They have also a revolving rumbler which is used to smooth the boards in place of sanding. It is used mostly in the cheaper lines, the lumber being smoothed by friction against other prices of wood.

When our representative visited the plant they were hard at work upon an order for seven hundred seats for the Toronto Exhibition. A dry kiln is now being erected.

The engine and boiler room is detached. The boiler is of 65 h.p., and was made by the Jenckes Machine Company, of St. Catharines. The engine is an Erie slide valve 40 h.p.

The Stratford Chair Company, Limited.—One of the most prominent industries in Stratford is that of the Stratford Chair Company, Limited, which is conveniently located in the eastern part of the city. The building is of solid concrete, 220 ft. by 60 ft., and is four storeys high. This enterprise was established in 1904 with Mr. W. H. Crowe as the president of the company, and Mr. Frank A. Nicholls as the secretary-



Factory of the Stratford Chair Company.

treasurer. Under this management the business was conducted until 1910, when Mr. George McLagan became president, and Mr. W. J. Anderson, secretary-treasurer.

The Machinery

The machinery installed in all of the departments is of the most modern description. It includes two Baxter D. Whitney & Son shapers, a Falls machine glue jointer, a Billstrom clamp, a hydraulic press used for bending chair backs, made by Bancroft & Barnard, of Gardiner, Mass., chair machinery made by the L. C. McKnight Company, of Gardnier, Mass., and Nash, of

Milwaukee, and belt sanders made by the Wysong & Miles Company. In one corner of the factory they have a small machine repair shop where they do their own repairing.

The firm makes chairs, and specializes in pad and slip seat diners in quarter cut oak. They also make office chairs, rockers, den and library chairs, hall and bedroom chairs. In furniture they make sideboards, desks, book-cases, small tables, extension tables, cabinets, wardrobes, dressers, stands and chiffoniers in surface oak, satin walnut and hardwood finish. There is a large stock room in which is carried an immense stock so that the firm can always fill their orders without delay. Their goods have a reputation for neatness and variety in design, superiority in construction and finish and are packed to insure delivery to their customers in the same splendid condition in which they leave the factory.

In the rear of the plant is a large yard containing upwards of a million feet of lumber, thus insuring well seasoned stock for their lines. Their dry kiln has a capacity of 70,000 feet and is fitted with the Mitchell system of vacuum steam heating.

In the boiler and engine house there are two boilers, one a Waterous of 165 h.p., the other a 80 h.p. made by the Stratford Mill Building Company. The engine, also made by the Stratford Mill Building Company, is a Brown 80 h.p. Part of the machinery of the plant is driven by a motor, current being got from the Hydro-electric Company.

The Macdonald Thresher Company, Limited, of Stratford, Ont.,occupy a fine large new building of most modern construction. It is built of reinforced concrete with numerous large windows extending along both sides, the glass being rough rolled. There is also a sky-light running the full length of the buildings thus giving the maximum of light so essential to manufacturing plants.

This enterprise was established in 1876 under the firm name of Macdonald-Macpherson & Company. In 1886 Mr. Macpherson retired and the business was continued by the Messrs. Macdonald until 1893 when Mr. J. P. Macdonald retired. The business was then taken over by Mr. James Macdonald, the original founder, and his two sons Peter A. and John R. who immediately erected a new plant on the corner of Erie and Gore Streets, to meet the growing demands of the business. In 1903 Mr. James Macdonald retired and the business was continued by his two sons until in 1911 the business having grown to such proportions that a reorganization of it was necessary and it was converted into a limited liability company. Business came to the company so rapidly that it became necessary to again enlarge its facilities and in October of 1912 the contracts were let for their present fine quarters into which they but recently moved.

The total length of the new factory is 525 feet and 80 feet wide, a paint shop 100 feet long and storage building 450 feet long. The plant covers 5 acres of land and is situated immediately alongside of the main line of the G. T. R. to Owen Sound thus providing splendid shipping facilities. The offices occupy one end of the main building and are 34 feet by 80 feet and contain manager's office, general offices, superintendent's office, and upstairs a department for supplies.

The company manufacture the "Decker Line" of engines and threshers, wind stackers, self feeders, baggers, and all supplies for threshermen. Mr. J. R. Macdonald, who for many years has been connected with the business, is president and general manager, and his practical knowledge and long experience in the business ensures a greater development for the future.

Operation of the Single Surfacer

By William Adams

(Written specially for the Canadian Woodworker)

THE purpose of the single surfacer is to dress to thickness and fit for use, various kinds of lumber already sawn to approximate thickness. The use of the single surfacer enables the work to be done with less first cost of plant, with less expenditure of power, but with a greater time requirement than is offered by double and four-side surfacers.

The cost of adjustment and maintenance is less in a single surfacer than in a double one and a less degree of skill is required to handle the former—a machine particularly well fitted for small shops and for use in large ones preparatory to running certain kinds of work in molding machines.

The operation of the single surfacer should begin with the setting up of the machine, with the proper fitting of the belts and the condition of the journals and bearings. Good work may, perhaps, be done with weak, loose, crooked belts but better work certainly can be done with straight, well-fitted and well made ones, which will not slip or run off the pulleys during a heavy cut.

Endless leather belts, well joined or spliced are by far the best for driving planer heads, although the writer has more than once obtained excellent service from the impregnated, stitched cotton belt, commonly known as "Gandy." Rubber belts may have been used for planer-driving, but short lap leather belting is by far the best of all drives, save one, and that is an electric motor direct connected to the cutter head, which is the best of all drives for planers and for almost every other wood-working machine as well.

See that the cutterhead is driven at proper speed. The best work with the least power is accomplished at a certain speed, depending upon the characteristics of the particular machine in hand but the average speed for the heads of a single surfacer is about 3500 r.p.m. This may be a little more for small heads or a little less for large heads but 3500 will be found about the average of the best practice.

If the surfacer has been used, the operater should by all means determine by actual test that the cutter head and its shaft are straight and in good balance. It is impossible to do good work for any length of time with a head which has been "sprung" or which is out of balance. No matter how well the journals of such a head may be babbitted and fitted, they will not stay in shape, but begin to hammer themselves to pieces the very first revolution of the cutter head and they keep it up as long as the head is run in that condition. Therefore, always, when starting to run a used surfacer, either put it to the test or have some reliable person do it for you.

To test the head of a surfacer, remove it from its bearings, clean the center in either end, taking great care that every particle of dirt is removed, then place the head in a lathe, or between fixed centers if no lathe is available. Now revolve the head, whereupon any bending of the shaft will make itself visible at once.

The remedy for a sprung surfacer shaft is careful and intelligent work until the shaft has been straightened again. The straightening should be done while it is between centers, therefore they should be very stout, so strong in fact, that the centers will hold the ends of the shaft while it is bent again at the "sprung" place.

Between the centers of a stout lathe, is by far the best place in which to straighten a surfacer head. A lathe is a necessity after the shaft has been straightened, for, in almost every case, it is necessary to take a light cut over the bearings to bring them true again.

While almost all used surfacers are found with "sprung" heads—that is, the shafts are sprung close to, or where they enter the heads—there is no reason why a straightened shaft is not just as good as one which has not been bent. Some people have an idea that the oftener a shaft is bent, the easier it will bend again, but this is not so. After a piece of steel has been bent it is stiffer than before—not stronger—but stiffer and will require more stress to bend it the second time than it did the first time.

The above has been personally proven by the writer in testing to destruction, pieces of steel in a testing machine. Similar conditions to planer head practice were followed and stress was applied, and noted, until the shaft was bent a certain distance. Then the shaft was turned over so that stress applied again would straighten the shaft. It was found that the second bending required more stress than the first, the third more than the second, up to the eighth time the shaft was bent, when it broke under more load than had previously been applied during the many back and forth bendings of the shaft.

The surfacer shaft may, then, be bent back until straight, with confidence in its strength. To do the straightening, simply pry under the shaft, at exactly the right place, and with just stress enough, until the steel is straightened. Peening on the side opposite to where lever stress is applied will assist greatly in bending with great exactness, but after peening, beware where turning is done, for if the peened surface be cut away, the shaft will go crooked again as soon as the tensioned metal is removed, therefore if peening must be done, see that it is done where turning will not be needed.

Be sure that the bearings are well babbitted and have been scraped to fit the journals. Bearings fitted in this manner, run cool and well from the very start and there is no need of running the machine idle for a time to "let it find its bearings!" The scraped bearings don't have to "find" themselves; the mechanic who fitted them did that for them.

Before operating the surfacer, fit it with a shavings exhaust fan and piping. If you have but one machine in your mill, fit it with means for carrying away the shavings, for more and better work is always done on machines thus fitted. A very simple rig will suffice. Some lengths of stove pipe will answer if nothing better can be had, and any man can rig up a serviceable fan by fastening four or more vanes to a shaft and building a casing around this. More than one fan has been made by knocking the rim off pulley-arms, attaching vanes to the arms and fitting a wood and galvanized home-made casing around the crude fan-wheel this extemporized. But it worked and that was the result looked for.

(To be continued)

One of Ontario's Largest and Most Progressive Woodworking Plants

THE firm of Robert Stewart, Limited, started business in Guelph in 1855, being founded by Mr. Robert Stewart who still, at the age of 86, takes an active part in the business. He is assisted by his two sons, Messrs. R. D. and E. M. Stewart, the former taking charge of the financial and sales ends of the business and the latter devoting his attention to the lumber yard.

Mr. Robt. Stewart.

The plant is situated in a large three-storey building, on the ground floor of which are located the following machinery. A Berlin 108 sticker; a rip-saw, made by Cowan & Company of Galt, a rip saw made by Holmes, of Buffalo; a general surfacer, made by Cowan, of Galt; a No. 27 matcher, made by S. A. Woods, of Boston; and a cut-off and end matcher, made by Ballantyne, of Preston.

The engine and boiler room is also on this floor, and contains a 165 h.p. boiler, made by Goldie & McCulloch, of Galt, and a Wheelock 150 h.p. engine made by the same firm. There is also a 6 h.p. dynamo, made by the Westinghouse Company, of Hamilton. The latter is only used for lighting the plant. The boiler is fitted with a duplex steam pump for boiler feed. This is made by the Northern Manufacturing Company, of Toronto. Water is heated for the boiler in a Moffat feed water heater, made by Goldie & McCulloch, and there is a belt driven steam pump for pumping the water from the cistern to the boiler feed tank.

This firm uses Hanrahan's Automatic Dryer System of kilns. Their kilns have a capacity of about 30,000 feet.

The Departments and Machinery

The basement all under the plant is used for the storage of shavings for fuel and there is also a direct feed of shavings to the fire box from the second floor.

The turning room, which is situated on the ground floor contains two laths made by McGregor & Gourlay, of Galt, and a rip and cut-off saw made by Taylor-McKenzie, of Guelph. On the second floor the clamping for sashes and doors is done and for this purpose is employed a sash and door clamp made by Rowley & Hermance, of Williamsport, Pa.

In the sanding room is an endless bed sander, made by the H. B. Smith Machine Company, of Smithville, N. J. In the door department there is a buzz planer, made by Taylor-McKenzie, of Guelph, a pony planer, two tenon machines, panel raisers and a resister, all made by Rowley & Hermance. There is also a four-sided sticker made by C. B. Rogers, of Norwich, Conn., and a chain mortiser made by the New Britain Machinery Company, of New Britain, Conn.

Sash Department

In the sash department are two power mortisers, a tenoning machine, sticker, cut-off and rip saws. One of the mortisers was made by Fay & Egan and the other by Rowley & Hermance.

Blind Department

The machines in the blind department are a blind borer, made by McGregor & Gourlay, of Galt, a slat tenoner by the same firm, and a blind rabbetting machine, made by Rowley & Hermance.

Frame Department

In the frame department are a buzz planer, made by Taylor-McKenzie, of Guelph, a dado machine, and saws in connection with frames and a band saw, made by J. W. Murray, of Hamilton, Ont.

Stair Department

The stair department contains a stair mortiser, made by the H. B. Smith Machinery Company, of Smithville, N.J., a buzz planer, made by Taylor-McKenzie, of Guelph, and saws made by E. B. Holmes, of Buffalo.

Saw Filing Room

The saw filing room is on the third floor and contains band saw filing machines, a circular saw filing machine, two brazers for heavy and light band saws, rollers and sets, all made by Baldwin, Tuthill & Bolton, of Grand Rapids, Mich. There is also a large knife grinder, made by Cowan & Company, of Galt.

Glue and Veneering Department

The glue and veneer department, which also is on the second floor, is equipped with presses manufac-

Factory of Robt. Stewart, Galt, Ont.

tured by the Canadian Machinery Corporation, of Galt, and glue heaters made by the Crows Iron Works, Guelph. All the columns are clamped up here for round columns.

The native lumber used in the plant is birch, pine, spruce, elm and oak. From the United States they get white and red oak, cypress, white wood and mahogany, and from Western Canada, fir and the B. C. shingles, which are made of red cedar. About thirty-five men are employed in the factory.

A short distance from the factory the firm have a big finishing shop in which oak and birch for interior trim and for western work is finished.

They have a very extensive lumber yard close to both the Canadian Pacific Railway and the Grand Trunk Railway. This contains a general stock of hemlock, pine, southern pine, spruce, lath and shingles. It is the intention of the firm to build a large new factory at the east end of the yard next spring. The new building will be 160 ft x 80 ft., with boiler house and kilns outside of the main building.

In the lumber yard is a rip saw for sizing joists, scantlings, etc., which is run by a 10 h.p. motor, current being got from the Hydro-electric Company. The yard itself is about eleven acres in extent.

The firm state that since they started business fourteen other planing mill concerns have been established in Guelph, but that each failed and that now they own the only plant of this nature in the city. That they survived, they claim, is due to the fact that Mr. Robt. Stewart is a practical man and that the company is conducted along business lines.

Simple Chamber Furniture

By Paul D. Otter.

IN some previous articles I have endeavored to describe and illustrate some exceedingly simple pieces of furniture which, it was believed, would prove to be within the grasp of the men and women who love to work with tools, and who may want to "try out" some of these offerings. In this and succeeding articles it is planned to offer more ambitious subjects, some of which are sufficiently standard in design to be suitable for factory construction.

It will be noticed that the dressing tables shown in Figs. 1 and 2 are quite approachable affairs from the open character, and greater comfort and deliberation are to be given the hair dressing and other toilet operations by the use of the type of chair shown in front of the table in Fig. 2, which is distinguished from other chairs by the low back and different height of seat.

To the carpenter the construction of the articles shown in Figs. 1 and 2 is obviously apparent and it is only necessary to call attention again as in former articles to the almost invariable use of what will hereafter be referred to as a "construction frame" illustrated in Fig. 3. The outer size of this is determined on the detail drawing, for be it known that the carpenter should lay out some sort of drawing showing at least half of the length and width of the article. In this case, the plan is determined by the size of the top, which is 20 x 34 in. Now, in the drawing, 20 x 17 in. is sufficient to put in all needed dteail of half the construction for purposes of location of posts, which in this and usual cases should set in ⅜ to ¾ in. Then proceed to draw in on the half plan the position of the ¾-in. side and back rails, together with the drawer front, which is also ¾ in. thick. The rails should set in from the face of the posts ⅛ of an inch.

Having made this part of the plan, it will be easy to draw in this structural detail suggested in Fig. 3, the thickness for the ordinary case work for this frame being ¾ in. and the width of both stiles and rails 2 or 2½ in. Such a frame is usually jointed with dowel pins, and the corners to receive the posts cut out after the frame is made up, as indicated in Fig. 3. Here, again, as frequently happens, the front part of the frame is exposed to view, as will be noted under the drawer in Fig. 2, and this part of the frame must be of

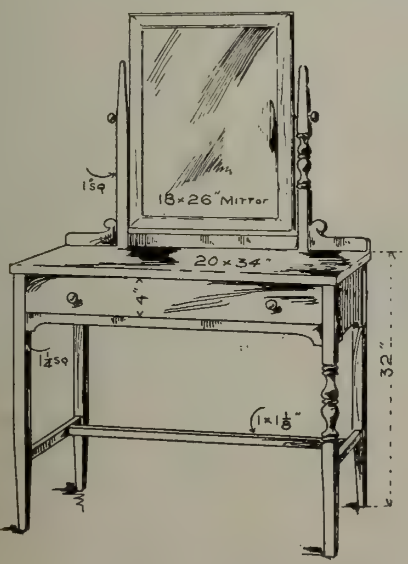


Fig. 1. General View of Toilet Table.

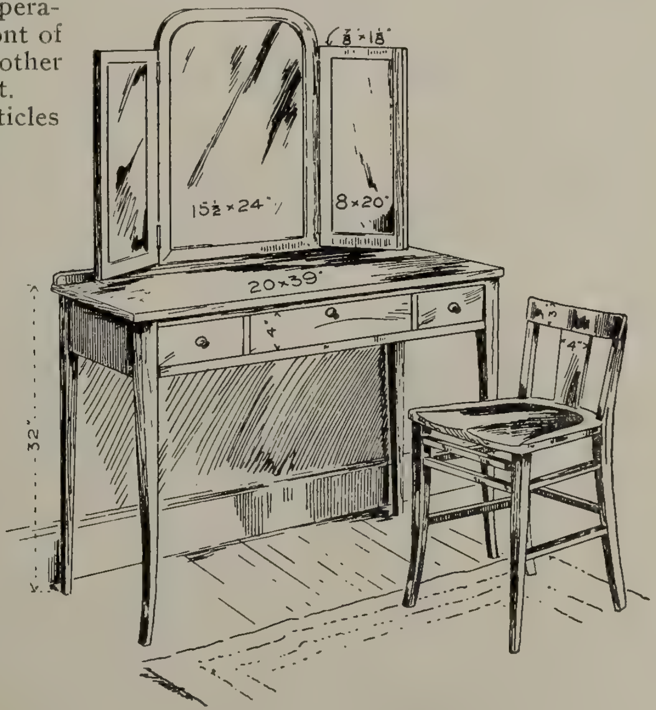


Fig. 2. Toilet Table or Dresser and Low Back Chair.

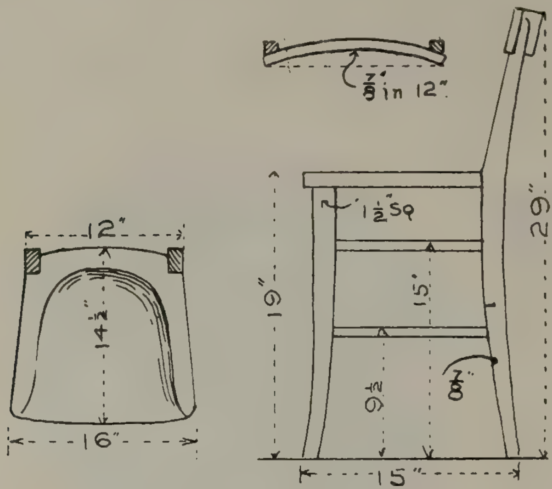
the same wood as the entire construction. Usually, when it is not in view, the frame is of basswood.

The "construction frame" is a means not only of giving a stiff construction, but also affording a place to secure sliding strips of a harder material upon which the drawers are to slide. The turned form of leg and mirror pillar shown to the right in Fig. 1 is offered as equally appropriate if the plain post is not desired.

Fig. 2 has the added attraction of the swinging side mirrors, so much desired in dressing the hair. A certain delicate character and finish should be given to

cured from 1¾ to 2-in. squares which, when reduced to a finished size, generally measure 1½ to 1¾ in., respectively. This allows for roughness or squaring up of other imperfections. The posts in Fig. 2 are dressed to a square of 1½ in. at top and reduced to a curved tape of ⅞ in. at floor.

As to the chair shown in Figs. 2, 4 and 5, it is a distinct part of the table, and when not in use it is placed directly under the table out of the way. When in use the low back affords sufficient back support, yet does not retard the use of the arms in dressing the hair—



Figs 4 and 5—Details of Toilet Table Chair Shown in Fig 2

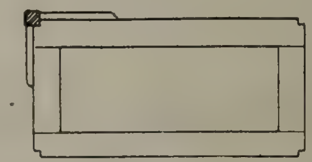


Fig 3—Plan of Construction Frame

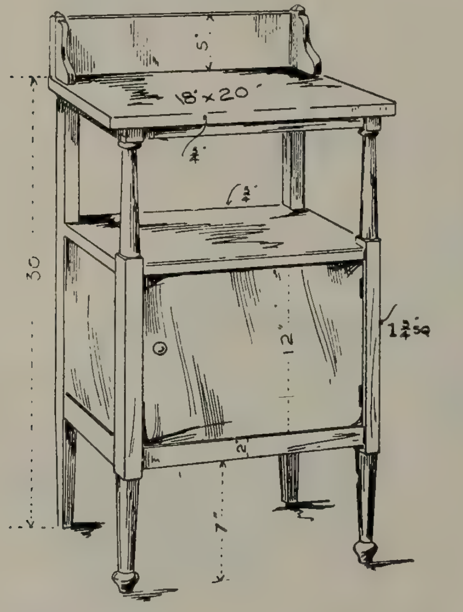


Fig. 7. Wash Stand and Somnoe.

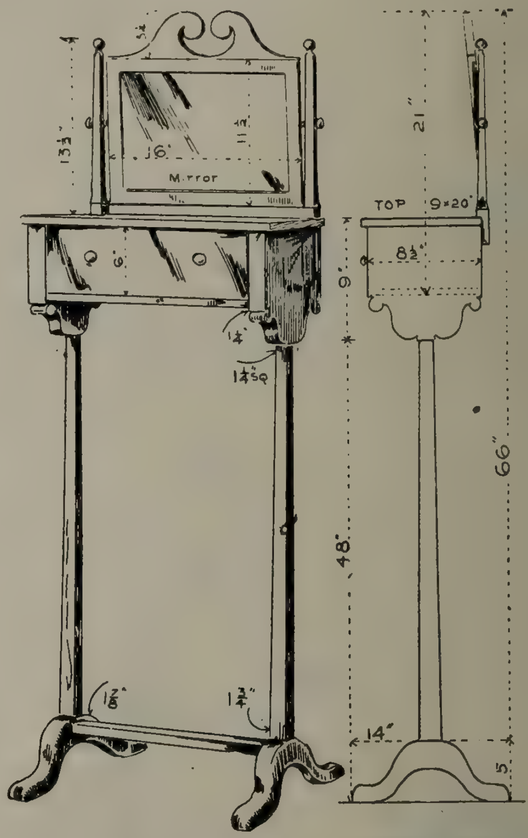


Fig. 6. Side and Front Views of Shaving Stand.

the making of these mirror frames and material of ⅞ in. thick and having a finished width of 1⅛ in. will make frames amply strong, yet light in appearance. Make the rabbet for the glass ½ in. deep and treat the face of frame to a low round shape. Cover back of framing with ⅛ in. paneling or veneer, neatly secured with round head brads. As thin stock is hard to secure, a certain quality of hard-pressed straw board is being used very generally for such purposes. The middle mirror is held and stiffened by two cleat strips screwed firmly to the frame and to the back rail of the table. Material dressed to a thickness of ¾ or 3-16 of an inch is universally used for most all forms of furniture, while post stock for the lighter carcases is se-

considerations which give these two pieces of furniture growing popularity among women. As the back posts of this chair are secured from a ⅞-in. board 2½ in wide, sawed to a pattern made from shape indicated, it will not be a difficult chair to make, as the two posts are screwed to the seat in a vertical outside width of 12 in. and square to the front.

The curved and tapering form legs are obtained from 1½ in. square stock and are secured by two dowels each to the under side of the seat, having an outside width of 15¼ in. The stretchers are ¾ in. square.

The seat is of solid or jointed board dressed to a

thickness of $1\frac{1}{8}$ in. and hollowed out in the deepest part to $\frac{5}{8}$ in., forming the saddle effect indicated.

The top slat may be secured by using a draw-knife and spoke shave in producing an even sweep of $\frac{7}{8}$ in. in depth in its length of 13 in., and by a pattern or template previously made, mark out the back curve to produce a curved slat which shall have an even thickness of $\frac{5}{8}$ in. and have a finished width of 3 in. and length sufficient to project well over the shouldered out ends of posts. After the chair is set up ready to receive the slat and banister, the excess of length may then be marked and cut off to have an overhang of $\frac{1}{8}$ in. on outside of posts. Use a depressed screw on each post and fill up after with flush plugs.

The banister may be flat measuring 4 in. in width and $\frac{1}{4}$ in. in thickness.

Figs. 4 and 5 will give further information about the building of this chair and, in passing, it may be mentioned that the same directions apply in building a reception or light hall chair, except that the back would be continued to a customary height of 20 in. from top of seat and 18 in. would be the height from floor to top of seat, instead of 19 in. as shown.

The shaving stand, Fig. 6, showing front appearance and side view, will, I am sure, house all a man's toilet articles and from its light, open construction permit him to move it about to secure favorable light. In these days of lighting by electricity, a cord and a bulb stand will put the shaving operation into a real luxury.

For its height over all, of 66 in., the foot and shaft are in this instance made of $1\frac{3}{4}$-in. material, the shaft being tapered on four sides from bottom to top, to $1\frac{1}{4}$ in. square, where it is firmly doweled with a large, long dowel to the ends of the case, which are also $1\frac{1}{4}$ in. thick. This shaft properly, however, should continue through the center of these end panels and be planed off and scraped smooth with the main surface. This method would give unquestionable strength and well pay for the added care of producing good work.

Make use of the "construction frame" referred to in Fig. 3 for constructive strength and for the drawer to slide upon.

The mirror standards are made of 1-in. squares of well-selected stock for strength and are sceured in the manner shown. They can be left straight or given a taper as shown, with a neatly-turned ball at the end. The mirror frame is plain like a picture frame, with the top ornament added, such as the open pediment shown, or some other simple Colonial feature. The foot, while it may properly be left smooth and square edged in its final finish, may be safe-guarded from damage and mar in use by giving the top edges a well-rounded form. In place of the single swinging mirror, a triple form of mirror, similar to that provided for in Fig. 2, is often desired for shaving operations.

The guest-room or a room not provided with running water, a washstand and somnoe will be found to be a most necessary form of furniture. Fig. 7 indicates sufficiently the construction and manned of making it. This form is very frequently in harmony with other furniture in a bed-room when made in basswood or maple and given an enamel or old ivory finish. A $\frac{1}{4}$-in. plate glass is now much used for the top of such furniture, giving a surface easy to clean and permitting a lace or embroidered doily or scarf to be laid under as an added attraction of neatness and daintiness.

When you use reason-why advertising, telling people things that will make them want the goods, you are using advertising that will pay.

Efficiency in Wood Bending

It has taken longer to get modern efficiency ideas introduced into the work of steaming and bending wood than into the general machining and working of wood. But we are now getting improved appliances for steaming as well as for bending, and these things are all worth investigating by those who have occasion to bend wood for their work.

Back in the old times the preparatory process for bending wood consisted of boiling or steaming it in some wooden vat or open tank. These methods, while reasonably effective as far as preparing the wood for bending is concerned, were extravagantly wasteful of heat energy. The per cent. of efficiency of steaming or boiling was really very low and much more of the heat was wasted through radiation than was consumed in preparing the wood. There is some of this kind of work to-day, quite a lot of it, in fact, and quite a lot too much of it. There are other appliances to do this work. There are modern steaming retorts made of metal, and arranged with opening and closing doors that can be put in place and tightened up easily so that not merely live steam may be used, but actual steam pressure may be applied in the preparation of wood for bending. With one of these modern retorts a man should be able to steam wood without using any more steam than was actually wasted by the older methods. This is certainly worth something. It is a great step in the matter of efficiency in this work.

For example, we might apply the fireless cooker or the thermos idea to these steaming retorts and so thoroughly insulate them that there will be very little loss of heat through radiation. Given a retort thoroughly insulated like a fireless cooker or a thermos bottle, and one could fill it with wood to be bent, let in steam enough to raise the temperature thoroughly throughout the wood contents, supply enough moisture to saturate it, then shut it up, shut the steam off, and let it soak for a half a day or more. The result should be thoroughly steamed wood in good shape for bending at the expenditure of only a very small percentage of steam energy as compared with what has been used in the past for such work.

For a Factory Floor

A mixture of two and one-half parts of clean sawdust, two parts sand, and one part of cement, used instead of concrete for floors, is said to be especially adapted for factory floorings. Men often go lame from working upon a cement floor, and it is fatiguing if no worse evil results. The sawdust floor also is elastic and does not result in such damage to tools or fragile objects falling upon it. It can be laid for less than one-half the cost of concrete, and will stand hard wear, but is not adapted for outdoor use. Such floors are warmer and less noisy than concrete floors, and it is probable that they will be widely used in the future.

To Mark Your Tools With Acid

In marking iron tools, the following method will be found to give good results: Melt a little beeswax or tallow, and pour it on the iron at the place to be marked. After the wax or tallow cools, take an awl or sharp piece of steel, and do your writing in the wax. Pour a little nitric acid on the wax where you have done your writing, and allow to remain a few moments, then wipe off the wax, and the writing remains indelibly marked in the iron.

A Large and Modern Winnipeg Sash and Door Plant

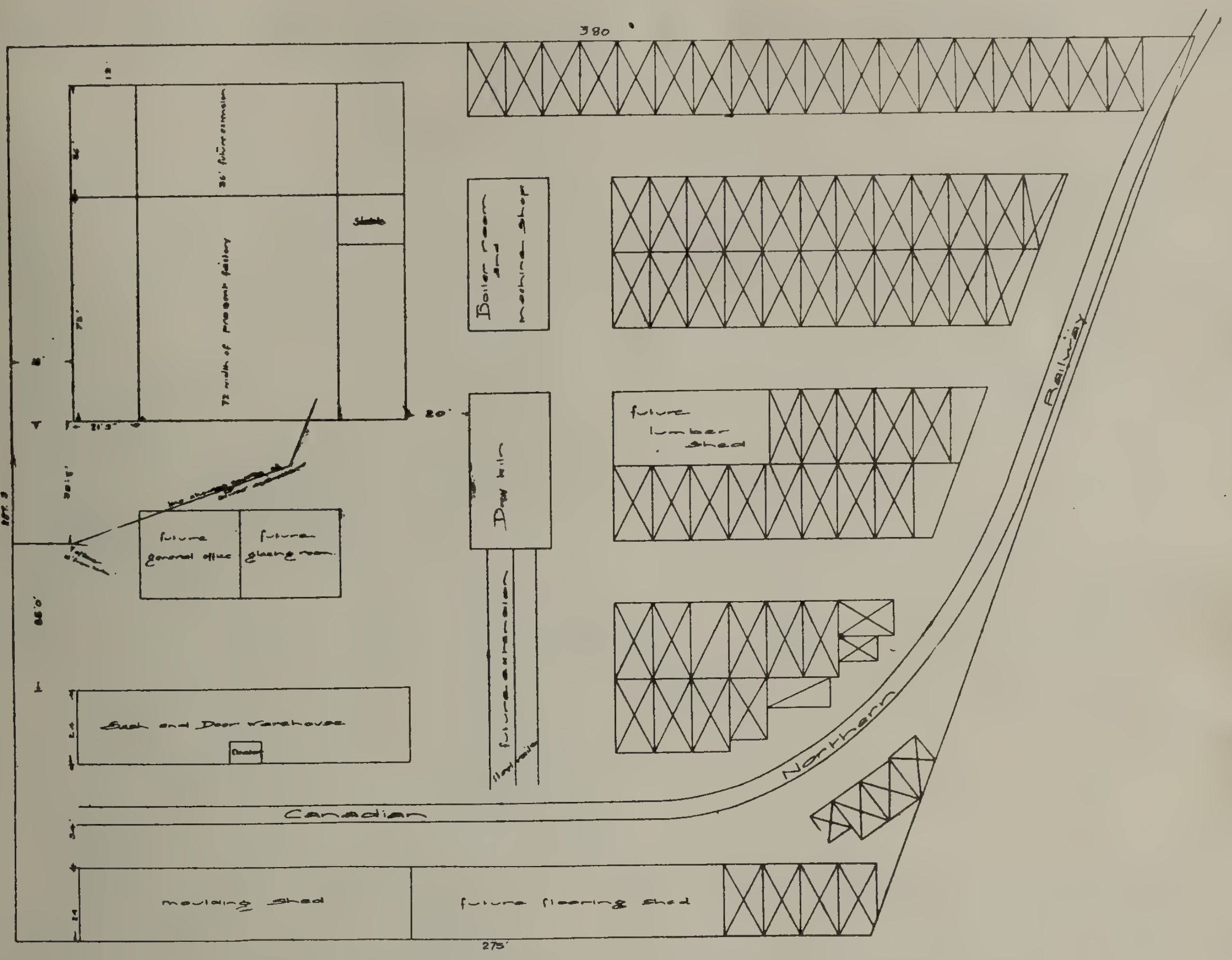
ONE of the newest, and one of the most modern as regards equipment, if not the largest of the Winnipeg wood-working plants is that of the Acme Sash and Door Company, which is located at Norwood, to the south of the city. This plant represents the latest and most approved practice both as regards general lay-out and mechanical equipment, and has been designed along lines which are well calculated to give a maximum of efficiency and to permit of work of a high quality being turned out at a minimum of labor and expense. The machinery employed throughout is of the highest class and the most modern design, and the plant is driven throughout by electrical power provided by the Winnipeg Electric Street Railway Company.

The sash and door factory was built in the fall of last year, and manufacturing commenced early this year. The size of the factory is 107 feet in length by 72 feet in width, and has a height of two storeys. It has been so designed as regards strength that an additional storey can be added at any time, and as soon as the existing equipment becomes inadequate to cope with the demands of the trade this alteration will be carried out. The machinery at present installed in the factory consists of the following units: One No. 108 Berlin 12-inch sticker; one 8-inch American sticker; two Berlin cut-off saws; one Canada Machinery Corporation dado saw; one Berlin feed rip saw; one Jackson-Cochrane rip saw; one 30-inch surface planer; two Berlin jointers; one band saw; combined shaper and jointer; one sanding machine; one combination saw; one tenon machine; one sash sticker; one New Britain chain mortiser and one sash relisher. Other equipment includes sash clamps, veneer presses and a number of smaller items.

The factory building rests upon concrete piers. There are fifty-two of these, each having a sectional area of 24 square feet. The joists of the lower floor are 2 x 14, laid on 16-inch centres. Those of the top floor are 6 x 12, laid on 4-foot centres. The flooring throughout is of 3-inch matched flooring, and the roofing employed is of the Peerless brand. The building is covered with corrugated iron. To the front of the factory the sorting shed is situated, the two being connected by large sliding doors. The boiler house is located near the factory, to the back of, and some twenty feet removed from, the latter. This is a brick structure with concrete roof and floors, and has a length of 50 feet and a width of 33 feet. The heating plant of the factory is housed in this building, which also affords accommodation for the machine shop. The boiler employed is a Waterous high pressure tubular, this type being chosen in case it should ever be necessary for the company to generate its own power. A large refuse vault is provided in connection with the power house, together with a fan system for carrying the refuse from the factory to the boiler house. The heating of the factory is carried out upon the most approved of modern principles, the top floor being heated by steam coils and the lower floor by the Vente fan system.

The site of the new plant is located on the Rue des Merouns, and consists of two and one-half acres extending back to the tracks of the Canadian Northern Railway, a spur track from which serves the plant. Although the factory is now in full and successful working order, a good deal yet remains to be done before the whole plant is completed. It is proposed to build a large sash and door warehouse, in which a heavy stock will be carried. Additional offices are also to be erected, together with a commodious lumber shed, and a flooring shed. The yard is also to be planked over, and trolley lines laid down in all the alleys to facilitate the handling of material. When these additions are complete the Acme Sash and Door Company will have a plant which for efficient operation and

Factory of the Acme Sash & Door Company, Winnipeg.



Plan of the Plant of the Acme Sash & Door Company, Winnipeg.

expeditious handling will not be surpassed anywhere in the West. It is estimated that the output will be at least $35,000 per month in value.

The company is capitalized at $100,000, the expenditure on plant to date being about $65,000. The officials of the enterprise are as follows: T. D. Robinson, president; Fred Hinds, vice-president; E. M. Counsell, treasurer; A. T. Wilson, managing-director. The board of directors consists of W. P. Alsip, A. B. Anderson, W. W. Cross, G. W. Ford, J. Sutherland and G. Sledding.

A Scrap-pile Incident

One day a planing mill man who always has an eye out for the chance of utility, came across and captured an order for a lot of small pieces. They were something like ½-in. square and 6 or 8-in. long, and the order called for several thousand of them—just how many is immaterial to the incident.

When this order found its way to the mill, the superintendent, thinking it would be a splendid thing to clean up scrap with, gave it to the band sawyer, who was rather scarce of work, telling him to work it out at spare moments. By and by, in making the rounds, the superintendent came across the band sawyer getting some stock from the lumber yard. When he asked him what it was for, the band sawyer replied that he was getting stock to make those small cleats.

Naturally, the superintendent protested against him getting fresh stock from the yards to make these small articles, and explained to him that the object in accepting the order and in turning it over to him was to use up some of their accumulation of scrap. The band sawyer, in turn, replied that he did not want to go digging through the scrap-pile to get stock for that order. The upshot of it was, the order was given to some one else to get out, with instructions to get the material from the scrap-pile.

There are two features to this incident which throw some light on the difficulty experienced in efforts to utilize trimmings and waste material generally around the mill. One of those is that often the workmen themselves never think of turning to the scrap pile to get raw material, but turn automatically to the lumber yard. The other is, the frequent cranky dispositions of workmen in matters of this kind, which shows a lack of interest in the welfare of the institution and of the co-operative spirit generally.

It is possible that these things, more than the difficulty of finding something into which scrap stock can be worked, handicap and render unsatisfactory efforts to utilize lumber products as they should be. It is hard to put any proposition of this kind through when the men who do the work are unfriendly and show a lack of interest in co-operation, as is the case in this incident. Let us hope there are not many like it.

The Value of Piece-work in the Cooper Shop

PROGRESSIVE coopers are becoming very deeply interested in the practicability of a piece-work basis of paying employees in many departments of this industry for the reason that the adoption of such a system promises for them the benefits which have been won by many other manufacturers in a large number of lines. That it is practicable to base the pay-roll upon piece-work for many cooper-shop employees is certain, for the savings accomplished and the stimulus given the work of men at the machines are considerations too important to be overlooked.

———— 191——

Jointed by ____________

Tied by ____________

No Staves to Bundle							Kind of Staves	Proof
18								
19								
20								

Waste of raw materials is the bugbear of the tight cooper, as it is of many another manufacturer, says The Barrel and Box. Modern business ideas have helped him subdue the enemy effectually, and piece-work promises many ways of even greater economy in operation of the plant, as regards both material and labor supplies. Any plan promising greater efficiency in the management of his business looks good, of course, to the tight cooper, hence the serious view which the trade is taking now of piece-work as a means of enabling the plant-owner to invest a maximum of the pay-roll in productive labor, and a minimum in non-productive.

The proposition may be fairly considered as involving several considerations. It should be remembered that necessarily close inspection promises improved quality in the goods produced. There are distinct advantages in cooperage where it is practicable and there are several items of lesser value. The prime consideration, of course, is that the cooper, in paying for piece-work, invests only in effective labor. He pays simply for what he receives. The second advantage is the stimulus which is lent to work throughout the shop when the men are put upon their mettle. A factory in which the employees are paid by the piece is pretty apt to be one in which the entire force is tuned up to a high pitch from the time the whistle blows in the morning until everybody knocks off in the evening. Other considerations involve an actual saving in materials, the development of better spirit among all employees about the plant, expert workmen being highly pleased when they are put in a position to earn what their ability commands, and a distinctly improved product as the result of special inducement being given for high-class workmanship.

Some of these results are indirect, but most of them are the immediate result of piece-work payment. It should not be inferred, however, that the system provides a panacea for all the ills of wasted material or non productive labor that the cooperage trade has to fight. While piece-work will go far toward remedying many inferior conditions in a shop, as the experience of manufacturers who have tried it out will attest, its adoption likewise brings to the cooper added responsibility.

Speeding up the rate of production of any commodity, unless it is a process of production involving only one or two extremely simple steps, for which the cheapest class of labor is required, may easily hurt quality. There is a tendency to treat with the proverbial lick-and-a-promise steps of manufacture which would otherwise be accomplished very painstakingly. Piece-work, with its strong incentive to rapid-fire operation, should be taken up by the cooper only with the realization of the careful supervision which it requires. Inspection much more constant and exact than that which is even ordinarily employed should be brought to bear in keeping the quality up. It is only when coupled with the constantly-improving quality of any commodity that piece-work, no matter what may be its advantages of economy, pays.

The processes of the cooperage trade lend themselves excellently to piece-work. The various steps in setting up a tight package, for example, are so clearly defined and follow in such regular sequence that it is always possible to adopt this system of payment in one department after another. Such employees as are retained upon day wages are those whose work is purely of such non-productive character that they constitute the less important portions of the working force of any large industrial plant being used where materials must be trucked from one spit to another, where they must be procured from stacks in a yard or warehouse or where the services of off-bearing gangs at machines are necessary. It is scarcely practicable to pay by piece-work for labor which does not figure in a process of manufacture. It must not be forgotten, however, that the productive departments working by the piece are almost certain to stimulate in their efforts to reach a maximum capacity the hands who are paid by the day.

Piece-work is not a brand-new idea in the cooperage trade, inasmuch as hand-coopers employed by manufacturers of tight barrels have been paid on this basis for their labor for years. The manufacturer is accustomed to paying for each of these packages as it is produced. An admirable adaptation of the piece-work policy of the hand-work shop may be made to apply to the several departments of machined-barrel manufacture. The idea of paying according to the unit of production is the same, and where it may be so much per barrel in the manual shop it becomes so much per thousand staves jointed, so much per thousand sets of heading set up or so much per barrel raised in the machine shop.

The cooperage concern entering the piece-work system usually commences it with the heading-in crew. These workmen supply the finishing touch to the tight barrel and, with all materials coming to them ready for immediate use, it is entirely logical that each man be paid according to the number of barrels he can handle in a day. The barrel may be made the unit

of payment for the headers in piece-work. Automatic counters resembling speedometers may be supplied in the shop, one to each man in the heading gang, and as each barrel leaves the header's hands to roll to the inspector it may be made to pass over the counter, scoring one for the laborer. These automatic records are easily checked at the end of the week—some counters are designed to combine the qualities of an adding machine with the virtues of an estimator—and at the rate of so much per barrel headed it is easy to figure the contents of each workman's Saturday envelope. On account of the rapidity with which materials are fed to the headers, it is not unusual that the operations of this gang are hard pressed by the work of the departments preceding. Then a contingency arises which must be taken care of in proper form if the piece-work scale in that or other sections of the plant is to turn out satisfactorily.

In case of any piece-work section becoming overcrowded, thereby causing the men in that department to become swamped and also retarding the maximum production capacity of the steps preceding and those following, the piece-work cooper usually instructs his foremen, or assistant foremen to jump in and help any crew which seems to be getting behind. Inasmuch as the foreman is in a supervisory capacity, and is at the same time a trained workman, his assistance for a few hours at any post will not interfere with the rest of his duties, and his work may be checked in with the work of the crew he is helping, giving them the benefit of his endeavors and at the same time straightening out the tangle. Let one incident of this sort occur, according to coopers who are manipulating the piece-work problem successfully, and the plant-owner will be surprised at the amount of good-will and co-operative spirit which the timely assistance of the foreman directed toward the advantage of the men in the shops will produce.

The barrel may also be made the unit of payment in placing the raising crew on piece-work. Automatic counters are frequently employed in recording the results in this department, as each barrel may be made to register when it is knocked together for raising, if the counter is properly connected. It is also practicable to place the foreman or foremen in charge of the stave jointers and heading jointers and raisers as well. The shop bosses who check the number of staves in the bundle, or the number of sets of heading, as both of these materials go to the jointers, may be empowered to keep tally on the raisers, these workmen operating at so much per barrel.

Stave jointers and heading jointers, inasmuch as they deal with materials instead of barrels, must be paid by the thousand pieces of stock handled. A form may be used, jointing and tying being recorded upon a card divided into squares with columns for the number of staves and the proof. A card may be tacked up before each jointer and the number of staves to the bundle and number of bundles handled by him checked off by the jointing inspector.

When jointers are paid by the piece, the greatest advantage in saving materials is evidenced. Jointers who are paid by the thousand exercise greater caution in their work for the reason that only the staves and headings which prove up are credited to them. The shop card registers the number of bundles actually handled by each man in the course of a day, and a corresponding tally of proof kept in the office indicates the proportion of his work which was up to standard. He is paid only for this proportion, and herein lies one of the minor but none the less important values of piece-work. It induces the jointers, stave and heading crews alike, to pay more attention to their work with the view of making 99 99-100 per cent. of it prove up, thus effecting that greatly-desired end, improving the quality of the package as well as increasing the efficiency of the plant. The experience of coopers who use piece-work payments as generally as possible is that fewer finished barrels fail to stand the final test and that the general quality of workmanship exhibited in the jointing becomes greatly improved.

BARRELS FINISHED IN MACHINE SHOP.

DATE	6 Hoop Gum Brls.	6 Hoop 30 Gal. Gum		6 Hoop W. O Oils	6 Hoop R. O. Oils	6 Hoop 30 Gal. W.O. Oils		8 Hoop 34" W.O. Oils	8 Hoop 35" W.O. Oils		8 Hoop Whys.	10 Hoop Whys.			Shooks	Average Number Staves	Number Broken Staves	Split Ends

Paying riveters by the piece is one of the more advanced steps in this modern shop practice. In this case the smaller the unit of payment, the more satisfactory will be the results among the workmen and from the employer's standpoint of paying just for what he gets. There are 6-hoop gum barrels, 6-hoop white and red oak barrels, 8-hoop white oak oils, 8-hoop whiskeys and 10-hoop whiskeys. Manifestly, if each barrel were made the unit of payment the men upon 10-hoop whiskey work would labor at a great disadvantage each day in comparison with the "speed merchants" setting up 6-hoop gum barrels. Constantly, it is upon the punch of each riveter that the automatic counter should check. So much per hoop is the proper scale of labor for piece-work in this department.

The final and most involved process of paying by the piece is in the trimming department. The processes of this department are sometimes short, sometimes tedious. The result is that piece-work is apt to be one laborer's meat and another's poison, like the old proverb, for it takes more time to replace a broken or defective stave than it does to flag a barrel. The cooper who pays his trimmers by the piece, however, will set a standard of workmanship so that all men in the department may at least earn a comfortable wage for average ability. The workman who is unable to trim from 20 to 30 barrels during a 10-hour working day has no place in the trimming crew.

The Wooden Box vs. Substitute

THE subject of the relative utility between the wooden box and the substitute package from an outside standpoint, is one which is certainly too large for an expert opinion from any but men who have made actual tests, writes Mr. W. R. Anderson, in The Barrel and Box. This, I have not done, but were I to be selected as the referee or judge in a contest to determine the relative utility of each or both, the first man I would get hold of as an assistant would be a freight handler at a terminal or junction point of a big railroad, who would be authorized to get a big pencil tablet and a pocketful of pencils and write down what he finds. There may be many ways of determining the usefulness of one kind of package or another, but the best and surest way to satisfy the curious is to see the results of a demonstration, such as is shown in testimony submitted in the recent Pridham case at Los Angeles. This paper, therefore, will be made up largely of proofs, tests and experiments, most of which information has been published in several of the trade papers and which most of you have doubtless seen. F. M. Driscoll is the freight agent of the Southern Pacific Raliroad Company at San Francisco, and he started a test at his station on January 9 and at the end of ten days (excluding Sunday) finished up with the following report:

Outbound.

Date.	Total wooden pkgs handled.	No. in bad order	Pct. in bad order.	To. pulp or fiber pkgs. handled.	No. in bad order.	Pct. in bad order.
Jan. 9	6966	72	1.0	729	211	29.00
Jan. 10	7228	106	1.4	628	192	30.0
Jan 11	8719	151	1.7	1165	276	23.0
Jan 13	6906	33	.4	627	116	18.0
Jan. 14	7729	152	2.0	564	175	31.0
Jan. 15	6820	56	.8	1003	271	27.0
Jan 16	7881	115	1.4	824	193	23.5
Jan. 17	6414	51	.8	648	93	14.5
Jan. 18	8296	100	1.2	936	181	19.0
Jan 20	7523	65	.8	701	161	23.0
Total	74482	901	1.29	7825	1869	23.88
Inbound.						
Jan 9	661	10	1.4	1197	1180	98.0
Jan. 10	1778	16	.9	277	133	48.0
Jan 11	1408	6	.4	79	58	73.0
Jan. 13	2788	33	1.2	110	62	56.0
Jan. 14	1949	7	.4	141	120	87.0
Jan. 15	1506	17	1.1	20	13	68.0
Jan. 16	1431	14	1.0	760	760	100.00
Jan. 17	1804	10	.5	399	396	99.5
Jan. 18	2356	0	.	139	89	63.0
Jan. 20	1736	15	.7	133	43	34.0
Total	17417	128	0.73	3255	2854	87.70
Grand total	91899	1029	1.12	11080	4723	42.62

Total Wooden Packages.

	Outbound.	Inbound	Total.
Total handled	74,482	17,417	91,899
In bad order	901	128	1,029
Percentage bad order	1.29%	0.73%	1.12%

Pulp or Fiber Packages.

	Outbound.	Inbound.	Total.
Total handled	7,825	3,255	11,080
In bad order	1,869	2,854	4,723
Percentage bad order	23.88%	87.70%	42.62%

During these ten days each package handled was carefully scrutinized for any damage and results are shown below.

Chafing of pulp board packages, slight punctures and unglued flaps were considered exceptions, as well as more serious damage.

Any broken wood in boxes, split sides or even minor damages to slats or edges were considered exceptions.

Both kinds of packages were examined with equal impartiality to note any deviation from perfection.

The above is my view from an outsider's standpoint of the relative utility of the wooden and substitute shipping container.

In practical tests to determine the efficiency and serviceability of a package of whatever kind, whether it be wood, corrugated paper, pulpboard, raw hide, pasteboard, sheet iron, tin, glass, silver or gold, it would not be fair for a wooden box manufacturer, for instance, to select for the basis of his test the most perfect box he could turn otu, and as against it the flimsiest of the so-called substitute packages; nor would it be fair for the manufacturer of corrugated, pulpboard, pasteboard, rawhide or other substitute packages to use an especially made package and attempt to demonstrate its superiority over a cheap and flimsy wooden box. The average run of package for any given commodity, whether the package is made of wood or fiber, or whatever else, should be the basis for manufacturers, shippers, the common carriers, freight handlers and others interested in determining the relative utility of the package, for any experiment whatever.

Coping and Coping Saws

THERE are some nice things about carpentry which furnish excellent opportunities for the development of his skill but of which the average workman is very apt to fight shy. One of these is the miter joint and another to which, however, only comparatively few carpenters take kindly, is coping. There are some too, who fail to connect one with the other and who understand that by first cutting a miter is the way to obtain the pattern for coping.

Heretofore, in putting the base boards in the various rooms of a house it was customary to make not only the lap joints in a string piece but the corner joints as well by mitering. This too, was the case whether the base was plain or molded. The general practice at the present day is to make the inner corner joints by coping and miter only the laps in a string piece and the corners that point outward where it is essential to miter in order to obtain a good joint.

It is at times amusing to observe a carpenter who professes to have thoroughly learned his trade laboriously whittling out a pattern for coping so as to fit the molding—either base board or picture molding—when really all that he has to do to get his pattern on each piece is to miter it, allowing the point of the miter to run in on the molded part and when he cuts it off at a miter he can take the coping saw and follow the upper corner of the cut made in mitering and he has his cope. It matters not whether it is base, picture molding or what may be the form or shape of stock, he can always get his pattern for the cope by using a miter box.

In the estimation of the writer coping is a pleasure to a workman who takes kindly to it, providing he has a decent coping saw. There are coping saws at present on the market which one can buy—frame and a dozen blades—for 25 cents, but many of these are simply a nuisance. It is economy to pay more money and obtain a respectable blade. They are all cheap enough and for 50 cents one may purchase a coping saw frame and half dozen coping blades that will serve an excellent purpose. It is seldom worth while to buy a coping blade that costs less than 10 cents and it is perhaps better to pay 25 cents for one.

By using a good blade a workman will save enough over the time it takes fooling with one of the cheap sort to more than pay for half a dozen good ones. So, brother chips, don't try and play cheap on coping saws. When you start on a job of either coping or of mitering see that your tools are in good order and make the right kind of a job out of it. Then and only then will you get satisfaction and pleasure out of the work.

Carpentry and House-Building

A permanent department devoted to practical problems of construction and planning. Readers of the Canadian Woodworker are invited to contribute to this department and to submit details of work involving special difficulties.

Mortise and Tenon Joint

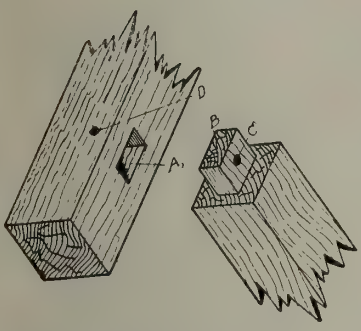


Fig. 1—Square Mortise and Tenon Joint.

FROM the modified butt joint it is only a step to the "mortise-and-tennon" joint, which is formed by cutting a hole called a "mortise" in one of the pieces of timber, to receive a projection called a "tenon" which is cut on the end of the other piece. This arrangement is shown in Fig. I. The mortise is shown at A, and the tenon is shown at B. It will be noticed that there is a hole bored through the tenon at C, and that another hole is bored in the mortised piece at D. These holes are so placed that when the pieces are joined together, a wood pin may be driven through both holes, thus preventing the tenon from being withdrawn from the mortise. The pin should always be inserted in a mortise-and-tenon joint. Ordinarily this pin is of hardwood, even when the pieces to be joined together are themselves of soft wood, and it may be of any desired size. Round pins from ¾ to ⅞ inch in diameter are ordinarily employed, although it may sometimes be found better to use a square pin.

The form of mortise-and-tenon joint described above may be used wherever the pieces are perpendicular to each other. When, however, the pieces are inclined to each other, a modification of the above joint known as the "bridge" or "straddle" joint is employed. This joint is shown in Figs. 2 and 3. It is similar to the square mortise-and-tenon joint, having a similar mortise and tenon, but these are cut in a slightly different way. In Fig. 2 the tenon A is cut in the end of the inclined piece and fits into the mortise B cut in the other piece. In Fig. 3 the mortise A is cut in the end of the inclined piece and the tenon B is cut in the other piece.

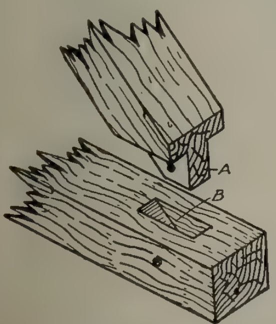


Fig. 2—Bridge or Straddle Joint.

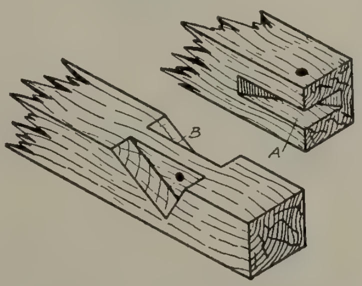


Fig. 3—Another Form of Same.

Gained Joint

The joints which have so far been described are applicable only where the members are subjected to direct compression, as in the case of the posts or braces, or in certain cases where direct tension is the only force acting on the pieces. When bending and shearing are to be expected, as in the case of floor beams connecting to sills or girders, a slightly different sort of joint must be employed.

One of the most common joints for such places is a modification of the mortise-and-tenon joint which is known as the "gained joint." An example of this form of connection is shown in Fig. 4 and it may be seen that the end of one piece is tenoned in a peculiar way. The tenon proper is the part A-B-C and this tenon sets into a corresponding mortise cut in the other piece as shown. It is evident that the tenon can not be held in place by a pin, but it may be secured by nailing.

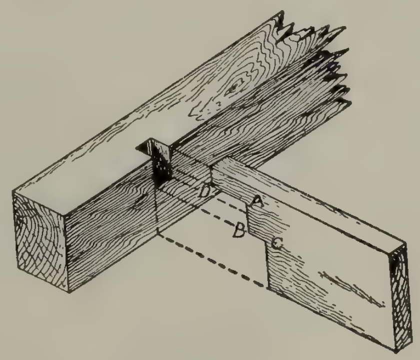


Fig. 4—Gained Joint.

The reason for this peculiar form of tenon may be explained as follows: A floor beam, or any other timber, which is loaded transversely, has a tendency to fall to the ground, and must be supported at its ends either by resting directly on a wall or sill, or by being mortised into the latter member. Moreover, in order that the end of the piece resting on the support, may not be crushed or broken, a certain amount of bearing surface must be available. This same bearing surface must be provided in every case no matter whether the timber rests directly on top of the sill or is mortised into it. Of course the simplest connection is obtained by resting the traverse piece directly on top of the sill without cutting either piece; but such a joint is not stiff and strong, and it is often necessary to bring the timbers flush with each other at the top or at the bottom. For this reason a mortised joint is used; and in order to obtain the required amount of bearing surface without cutting the piece too much, the form of tenon shown in Fig. 4 is employed. The

available bearing area here is furnished by the surfaces D-A and B-C and it may easily be seen that this area is the same as would be available if the piece rested directly on top of the sill.

The operation of cutting such a tenon and mortise is known as "gaining" and one piece is said to be "gained" into the other.

Tenon-and-Tusk Joint

A joint in very common use in such situations as those which have just been mentioned is a development of the gained joint which is called the "tenon-

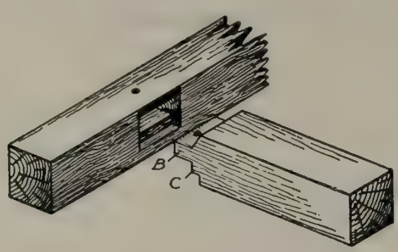


Fig. 5—Tenon-and-Tusk Joint.

and-tusk" or the "tusk-tenon" joint. This joint is shown in Fig. 5. The characteristic feature of this joint is to be found in the peculiar shape of the tenon which is cut in the end of one of the pieces to be joined, as shown in the figure. It may be seen that there is a small square tenon B cut in the extreme end of the piece, and that in addition to this there are other cuts C which constitute the "tusk." The bearing area is furnished partly by the under side of the tenon and partly by the under side of the tusk.

This joint makes a very good connection, and the cutting of the mortise does not weaken the piece of timber so much as does the mortise for a gained joint. It is especially applicable when it is desired to have the two pieces flush on top, although it may also be used in other positions. When the top of the tenoned

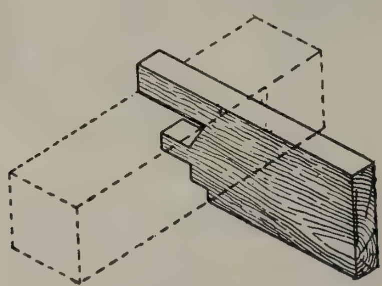


Fig. 6—Tenon-and-Tusk Joint with specially cut Tenon Piece.

piece must project above the top of the mortised piece, the tenon may be cut as shown in Fig. 6.

There are several ways of securing the tenon in place. The simplest is that shown in Fig. 7 where the pin B is passed through the tenon A and the mortised piece so as to hold the tenon securely in place. Another scheme is to cut the square tenon a little longer, as shown in Fig. 8 so as to pass clear through the mortised piece, and to fasten it with a peg B on the other side. The peg may be cut slightly tapering, as shown, so that when it is driven in place it will draw the pieces together. Still another plan is shown in Fig. 9. Here a small hole is cut in the header some distance back from the tenon and a nut C is placed in it, while a bolt B is passed through a hole bored lengthwise in the header to receive it. The bolt passes through the nut, which may be screwed up tight, thus drawing the pieces closely together and making the joint secure. In tightening this up, it is the bolt which must be turned, while the nut is held stationary inside of the square hole in which it is inserted and which is just large enough to receive the nut and a wrench.

Double Tenon Joint

Fig. 10 shows a form of tenon joint called the "double tenon" joint, which is not very extensively used at the present time but which has some advantages. As may be readily seen, there are two small tenons A and B through which a pin may be passed if desired.

Halved Joint

A form of joint which may be used to connect two pieces which meet at a corner of a building, is known as the "halved" joint from the fact that both pieces are cut half way through and then placed together. The pieces are held in place by nails or spikes.

If one piece meets the other near the center instead of at the end of the piece, and if there is danger

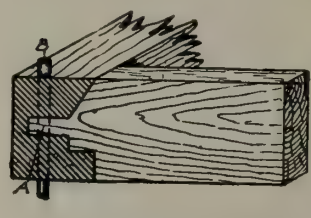


Fig. 7—Pinned Tenon-and-Tusk Joint.

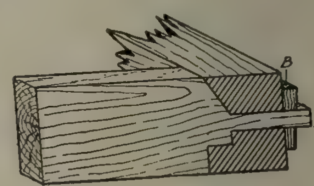


Fig. 8—Pegged Tennon-and-Tusk Joint.

that the two pieces may pull away from each other, a form of joint called the "dovetail" halved joint is used. Both the tenon and the mortise are cut in the shape of a fan, or dovetail, which prevents the two pieces from being pulled apart. This joint may also be cut with the flare on only one side of the tenon, the other

Fig. 9—Bolted Tenon-and-Tusk Joint.

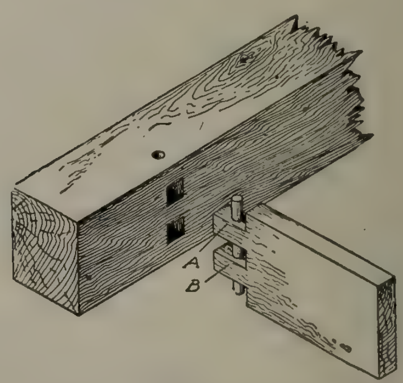


Fig. 10—Double Tenon Joint.

side being straight.—From Carpentry, by Gilbert Townsend.

Not all employees are impressed with the idea that the "old man" is a superior being. Don't try to lord it over the people who work for you.

Reducing Cost of Dressing Lumber Seventy-five Per Cent

IT is almost impossible to lay out a plan for a planing mill that will suit all manufacturers. The writer has made some improvements in a mill which reduces the cost 75 per cent. from the way we were manufacturing one year ago, so it looks as though it would be practical for others.

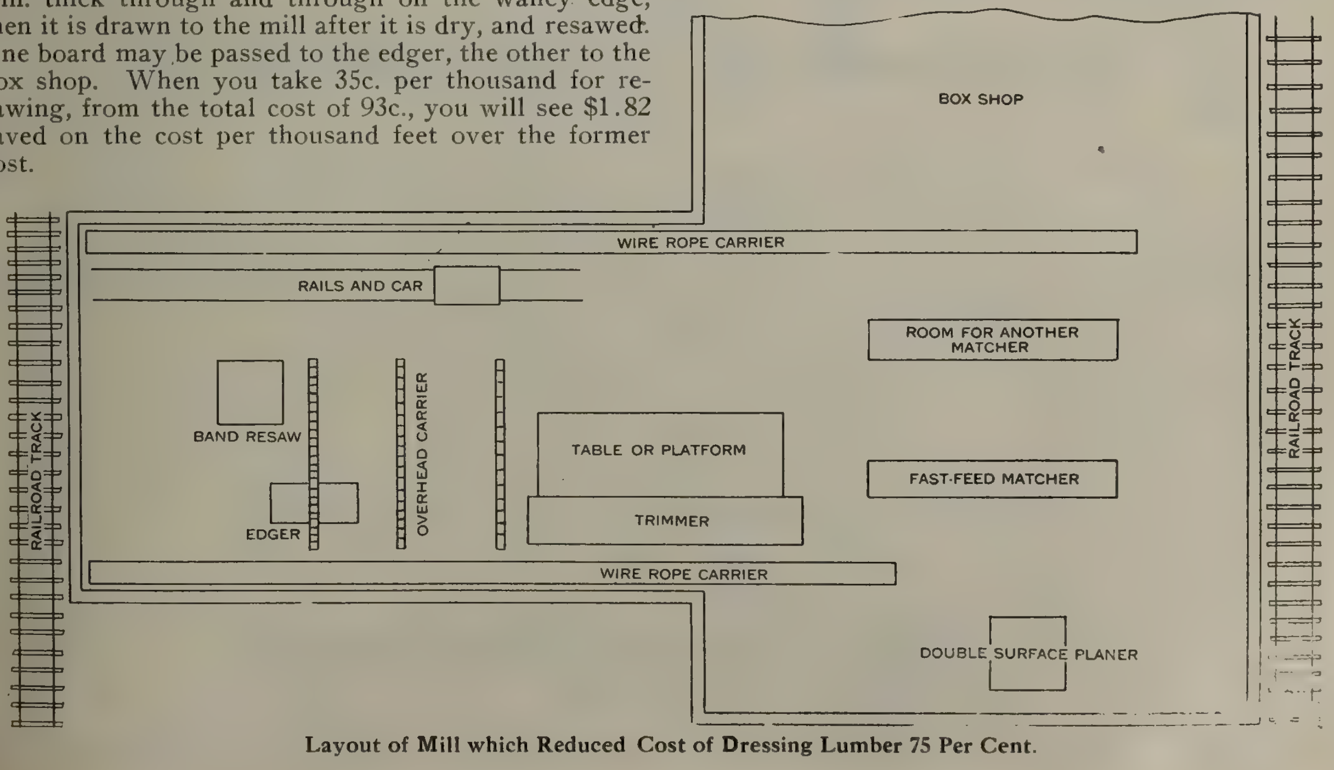
Our mill, in which we plane and match spruce boards, also factory flooring of hardwood, is situated in one end of a large building and next to the box shop. We keep the time of the planing mill crew separate, but all defective boards that are sorted out after passing through the planer are passed over to the box shop and the planing mill loses the labor on them. Any waney edge boards that are equal to No. 2 in quality and fit to edge, are sorted from the box boards, passed through the edger and on to the planer for dressing. All hardwood boards are brought into the planing mill and edged, split, trimmed, planed, matched, bundled and loaded into car.

Our work in the planing mill was done with two old-style planers, one of eastern manufacture and the other of western manufacture. The average cost per thousand feet to handle these boards, after they were brought into the mill to plane, match, trim, sort and load in the cars, was $2.40 per thousand feet. We have since remodelled the planing mill, adding a wing 60 ft. long, installed one fast-feed planer and taken out the two old ones, installed a band resaw to resaw 2 and 3-in. plank into boards, placed carriers for handling the boards, and find our cost, including the running of the band resaw, is 93c. per thousand feet, including a great deal of work for the box shop that has not been charged to it yet.

We saw a great deal of our small spruce and fir 2-in. thick through and through on the waney edge, then it is drawn to the mill after it is dry, and resawed. One board may be passed to the edger, the other to the box shop. When you take 35c. per thousand for resawing, from the total cost of 93c., you will see $1.82 saved on the cost per thousand feet over the former cost.

Herewith is a small sketch of the lay-out of the mill. You will notice there is a wire rope carrier extending from the end of the planing mill to the planer. The boards are taken from the car or team, as it may be, and carried on wire rope carrier to the trimmer, where two men trim them to length. The trimmings that are long enough are saved out for box stock and thrown one side, where there is a small double-surface planer. Any spare time, when the large matcher stops to sharpen or joint knives, the men plane the few boards that have accumulated and send them to the box shop. Having these boards trimmed before matching eliminates the running of several thousand feet in length of waste boards through the planer and matcher per day. As these boards come over the trimmer, a man places them for the operater of the matcher, and they pass through at the rate of 200 ft. per minute, direct to the car, where a man loads them.

On the other side of the planing mill will be noticed another carrier to supply the box shop with boards, which are taken from the cars or teams. Notice also the location of the band resaw and edger. Stock is passed through the band resaw, and, if defective, the man who takes away places the boards on the carrier to the box shop. If good, they are placed on a chain carrier which runs on an incline of 45 deg., then overhead, so that the gang edger and edging saw are underneath. After the boards are passed overhead they drop into the planing mill carrier and are delivered to the trimmer. The man who takes away from the resaw passes the boards that are clear or need the clear split off, and such boards as need edging, to the edger. These boards are edged and the clear sorted and piled back until enough has been saved to work, or are drawn to the yard until needed. We match about 550,-



Layout of Mill which Reduced Cost of Dressing Lumber 75 Per Cent.

000 ft. per month and make 600,000 ft. of box shooks per month. You see, these carriers have some work to do.

We find that by installing the fast-feed thin-knife planer we have increased the quality of our stock at least 10 per cent. In dressing knotty spruce and hemlock boards on the old-style planer, the knots would tear out, making the boards of an inferior grade or turning them into box boards.

No doubt when some mill men read this article they will say it was costing us too much to do this work in the first place, and I will admit it was. But you must take into consideration the amount of waney-edge boards that are sorted from the box boards, and there is quite an expense to that. We are doing the same now as before, but with the carriers we have eliminated a great deal of handling and reduced the cost accordingly. In constructing a new mill this extension should be at least 72 ft. long instead of 60 ft., then when resawing you will have room enough behind the elevated carrier to sort out certain widths when you have an order for a car all one width.

We find that when we saw logs at small portable mills it is better to have them sawed into 2 or 3-in. plank. When dry they are drawn to the planing mill, where they are resawed, planed and matched for shipping. There is a saving of 1,000,000 ft. in 8,000,000 on 2-in., and 1,000,000 ft. saving in sawing 6,000,000 on 3-in., and the cost of stacking, drawing, etc., is reduced some in handling thick stock. It is getting to be the custom among the lumbermen to resaw as much as possible. Some are even installing twin resaws, making three boards at one run of a 3-in. plank, which will still reduce the labor on manufacturing the finished board.

The accompanying photo will give a fair idea of how our machinery is arranged.—E. E. D., in The Wood-Worker.

Practical Pointers on Self Feed Rip Saw Practice

IT seems to me that in all the discussions on the merits of up-to-date machines the self feed rip saw is somewhat overlooked, says W. H. Rohr, in Berlin Quality. It, however, is a very important machine, especially in the big shops and factories where lots of work is gotten out. How would all the fast feed moulders, flooring machines, sash and door cutters and box saws be supplied were it not for the self feed rip saw. Factories cannot get along without it and it is kept going steady from morning 'till night,

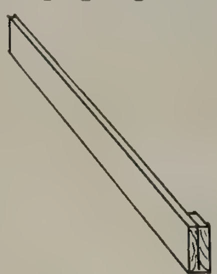


Fig. 1—Guide.

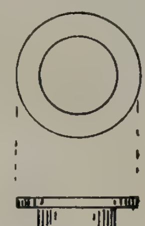


Fig. 3—Flange

so it is essential to have the best machine on the market.

Mill owners, when selecting new machines are careful to get up-to-date planers, moulders, shapers, etc., but their choice of a self feed rip saw is apt to fall on any kind of saw table with a pair of feed wheels geared to it. True, most of the saws are mounted on a good solid frame and have a nice iron table, adjustable vertically, but to my mind the most important factor, in the practical value of the saw, is the feed works and its manner or adjustment. Easy and quick adjustments are essential, for unlike the moulder no time is allowed for setting up the saw. It must always be ready for instant use.

Several years ago I operated a Berlin self feed circular rip saw in a large factory where the ripping consisted of sash, doors, moulding and hardwood trim. There was work enough to keep the saw pretty busy, but that ripping was just like play with a Berlin. Since then I have been through dozens of shops of all sizes but have never yet seen one that equalled the Berlin for easy, fast ripping.

What I particularly like about it is the ingenious arrangement for adjusting the feed vertically and raising it clear of the table, by pulling that upright hand lever into a horizontal position, see cut. This is very useful in case heavy boards choke down the saw in the cut, also in case hand feeding is desired on certain work. Another adjustment probably not appreciated or noticed, by any but the experienced operater, and on no other machine I know of is, one allowing the shaft carrying the spur wheel, to be set at a slight angle so the stock is fed in tightly aginst the fence, insuring against miscuts or stock feeding away from the fence. The out-feeding roll should set square with the table or parallel with the arbor so as to feed the stock straight out.

After many years of service the corrugations on the end of the out-feeding roll next to the fence, become worn down almost smooth. In this case remove the roll from the spindle and turn it end for end. The points of the spur wheel should be kept fairly sharp to get a good grip on the lumber and insure a positive feed. When worn down to the collar it can be replaced with a wornout saw ground down to size.

The range of feeds—75, 125 and 180 ft. per min. are ample for practically all kinds of work. 180 certainly keeps both the feeder and the off-bearer on the jump.

In ripping hardwood doors and trim it is very often necessary to straighten up the edges. With a little careful practice I have been able to straighten up stock with the feed right to a chalk line.

On coming to the Northwest I have noticed quite a difference in self feed rip saw practice. The sash and door rippers have a set of guides arranged in a convenient rack, to use in ripping different widths. They set the iron machine fence for ripping bottom rails or the widest cut and when they rip stiles, or sash, or any narrow widths, they simply insert the proper guide (see Fig. 1) instead of setting and resetting the regular fence. Besides saving time this insures all the pieces of a kind being exactly the same width.

Also the rip saw man never rehandles any pieces but rips up the stock into what it will make as he

comes to it. Saws for ripping sash and door stock are usually placed so the off-bearer can pile the stock right up to the bench cutters as it is being ripped. Saws for ripping moulding are placed near the moulders or anywhere convenient and the stock ripped from truck to truck, then sent to moulder. Moulding rip saws like moulders are generally equipped with a tally meter, a time saver in counting up number of feet.

The scrap edgings from the rip saws are dropped into a kind of trough (see Fig. 1) placed to the right of the off-bearer. When full the edgings are securely tied and cut into bundles four or five feet long and taken to the furnace room or sold for kindling.

I was quite surprised on stepping into a big sash and door cutting room to find all the self feed rip saws, which were Berlin make, equipped with spur wheels 9 in. in diameter. The old millwright told me the operaters did that so they could shoot a board through, then rest a bit. Anyway the large wheels fed through the wide heavy door stock without slipping or hesitating and at almost a shot gun feed. Of course with the

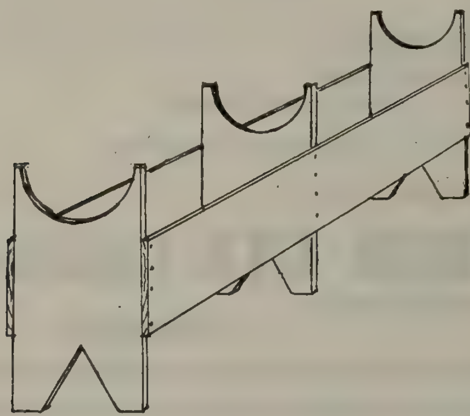


Fig. 2—Easily made trough for edgings.

back roll running the same number of revolutions per minute but being of smaller diameter the rim speed couldn't keep up with that of the spur wheel, so it had to do some slipping over the surface of the stock but that didn't seem to bother them any.

The saws were taken care of by an expert filer who kept the teeth gummed out in good shape on a swinging emery gummer, filed the backs with a slight bevel and spring set the teeth accurately to a gauge.

Fig. 2 shows a wooden flange which if fitted tightly into the rim of the arbor pulley will prevent the belt flying off when extra straining or load is thrown on the saw. Under normal load and conditions the belt will not fly off but accidents will happen. **Editor's** Note:

The Type of Rip Saw to Choose

Mr. Rohr, as champion of the self feed rip saw, is a decided success. He is a type of man whose enthusiasm grows with his ability to secure results, and as the results he has secured with a Self Feed Rip have been thoroughly encouraging, his enthusiasm never wanes.

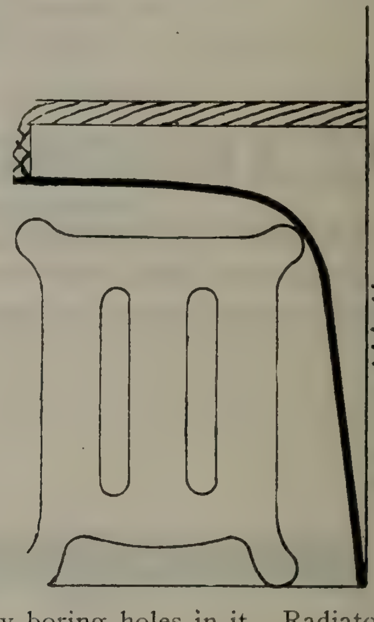
There are several points concerning rip saws that Mr. Rohr's article does not cover and the writer will attempt to do so. In reading over the article referred to, we must not forget that there are the band rip saws to consider as well as the circular, and that under certain conditions the band rip, even at a higher price, would prove more efficient and cost less for the amount ripped, than the circular. It is just as true that other conditions favor the use of a circular rip, so it is up to us to learn which machine the conditions in our plants favor.

In the first place if a plant has not already installed some band sawing equipment, it would show poor judgment to put in a band rip and then simply for that one machine buy a complete filing room equipment. On the other hand, if a factory or mill already has a band resaw, and large quantities of stock to be ripped, good judgment would be shown in the installation of a band rip. In such a machine the buyer would have a reserve capacity that no circular rip could give him.

Such a mill or factory would undoubtedly have immense quantities of standard width strips to rip, and the band rip saw would produce them at whatever rate the operater could feed, up to, say 300 feet per minute.

Building Window Seat Over Radiators

A WINDOW seat can be built in the manner illustrated which will not affect the radiation of heat in the least. Nail a sheet of iron on the underside of the seat extending down nearly to the floor and running the full length of the seat. It should be as indicated to throw the heat out from under the seat. There is no necessity of spoiling



the seat by boring holes in it. Radiators can be obtained ranging in heighth from fourteen inches, upwards.

Recently a certain firm was having numerous cracks in their 14-inch band saw and called in an expert to straighten out the trouble. The filer was a man of long experience with narrow saws and was a good workman, but was working with a four-foot back guage with a 1-32-inch concave. A glance at the situation and the expert determined what the trouble was. He placed one saw on the floor where he could have about 23 feet of it flat and then stretched a line along the back and found the saw had a ¾-inch crown in the portion which lay flat on the floor. He then put the saw on a bench and let the back down to his back leaving 1-64-inch in six feet, evened the tension, leveled the saw nicely and although it was full of cracks it has run regularly ever since, which is some weeks ago and has increased the capacity of the mill over 10,000 feet per day. It saws fine lumber without making any more cracks and without extending the old ones any further. A long back is a good thing but do not go to extremes.

The Sticker in the Moulding Factory

The Sticker Problem is Different in Different Kinds of Woodworking Plants — Good Practical Advice

THERE is quite a difference between operating a sticker in a molding factory and operating one in a planing mill, store fixture works, and similar plants. The stickerman in the molding factory employs different methods entirely. While the same general methods used in a planing mill can be used in a molding factory, still they would not be as practical, not so well adapted to the work, says Herbert Hillsey, in The Wood-Worker. The man operating a sticker in a molding factory sets up his machine with what he calls templets.

By molding factory is meant one manufactuirng moldings exclusively. There are, in Chicago alone, more than 100 of these plants. At the head of several of them are men who have made millions of dollars out of the business. The foreman in the average factory makes all the knives, keeps the templates in their proper places, keeps the machines in order, does all the grinding, besides the regular duties of a foreman. In the larger factories, however, the knifemaker tends to all these things. They rarely set up the sticker for less than 1,000 ft., and usually run anywhere from 10,000 to 40,000 ft. at one setting.

No material is dressed. It is simply ripped and sent to the sticker. Usually the face side is run with the bottom head. The reason for this is that nearly always the bottom side is straight or square, while the face side is more or less uneven, intricate, so to speak. The mold, therefore, when the face side is cut with the bottom head, enables one to use a square or straight pressurebar. This holds down the mold much more securely than it could be held down were it run face side up. And then, were it run face up, a special bar would have to be made to hold it securely while going through.

Often the bar will wear in one place, allowing shavings to clog in and scratch up the face of the molding; that is, if the face side is run up. If the bottom side is run up it will make no difference. When this occurs

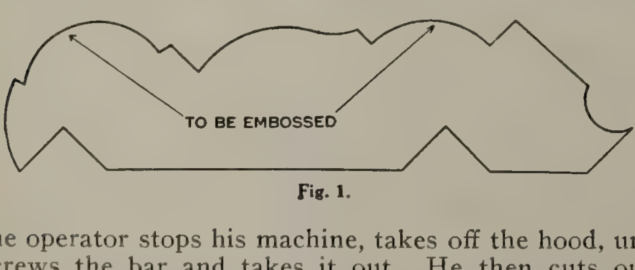


Fig. 1.

the operator stops his machine, takes off the hood, unscrews the bar and takes it out. He then cuts out the bad place with his pocket knife, but it will keep on clogging up from time to time, especially when he is running, say, 20,000 ft. All of this goes to take up more or less time, and anybody who has been fortunate enough (or unfortunate, whichever way you look at it) to work in one of these shops, knows the value of time. The operater that loses five minutes' time will probably receive his "walking papers" on next pay day, if not before.

All moldings go through the machine in the rough. Many of these plants specialize more or less on hardwood moldings. Utmost economy is the watchword. They buy the cheapest lumber, lumber that could hardly be used by other industries, scraps, as it were, ranging from 4 to 7 in. wide and anywhere from 1 to 2 in. thick. Most of these pieces are very crooked, some forming the letter S, while others, when laid flat, form a perfect W. This is the kind of material the stickerman must run through the sticker and have it come out

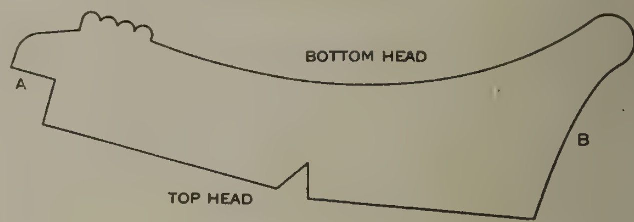


Fig. 2.

at the other end a perfect piece of molding, accurate, uniform and smooth as glass.

In running a piece of oak that a straightedge would hit in a dozen places and where one could put his head through at the places it doesn't hit, and making a molding of it, such as shown in Fig. 1, for instance, where every head make a particular cut, and the mold must be held down securely while going through, so the side and bottom heads will not vary in their particular cuts, the operater will naturally expect trouble with his feed. And when he has, say, 20,000 ft. of such stuff to run through, it is up to him to employ some drastic methods—and he does. It is a common thing to see 300 and 400 lbs. hanging to the chipbreaker, and weights aggregating 1,000 to 2,000 lbs. hanging to the weight holding down the feed rollers. I have seen a fellow drive a piece of birch, 3 in. thick and 4 in. wide, between the bar holding down the feed rollers and the machine. It must have been equivalent to a 3,000 lb. weight.

As nearly all these moldings will be embossed, they must be accurate, almost unreasonably accurate. They are embossed with steel dies, and must fit these dies within 1-100 in. And they must all be uniform. By this is meant they must all be exactly alike in thickness, width, and every other particular. When it is remembered what the material is, this is harder than it seems to be. When the stock stops in a sticker, one is prompted to loosen up something to get the stock started again. This always make a slight difference in the thickness or width of the molding. If some pieces are slightly different from others, the man embossing them will discover it, and, when he does, the stickerman can look for trouble. Also, the moldings must be smooth as glass, as no sanding is done on them. The stickerman in a shop like this is, to use a slang phrase, "up against it."

In running a molding as shown in Fig. 2, the face side is run with the bottom head. It is run in such a way that the bottom head cuts only as much as is absolutely necessary, while the top head, cutting the bottom side, cuts all it possibly can. The top head cuts the rabbet, leaving only 1-16 in. both ways for the outside side head. Another knife cuts all the way through, leaving

the outside side head but 1-16 in. to cut and making the molding uniform in width as well as thickness. A bevel knife cuts as much as possible of the inside side head cut. Referring to sketch at A and B, the top cuts as much here as possible and the side head finishes it. It will be quickly seen that the top head does most of the work. This is done because in long runs, did the top head not help, the side head cutters would soon become dull, which would necessitate sharpening many times in the course of the run. As the top head cuts the bottom side, and the other cuts are finished with the side heads, it makes no difference how dull they become. When, however, they become too dull they are taken out and ground.

When the operater sets up for a molding of this character, and has only a sketch and die to go by, when he must fit the sketch so that not a single part projects over the lines by 1-100 in., and has no gages, he usually has a job on hand, especially when an unreasonable boss expects the molding within a certain time. It would take too much time to describe fully the various stages he goes through in accomplishing this feat without the use of gages. Briefly, he goes about it thus: He takes a piece of white pine lumber, cut the same as the stock he is going to run. Then he takes the sketch, or pattern, holds it to the end of his white pine board, and carefully traces it. Next he takes a pocket knife and cuts the end of the board as nearly to the lines as is possible. Having got it cut to his satisfaction, he puts it into the machine so that the end just reaches the top head, throws off the belts and proceeds the same as though he were setting up with a templet.

When he has the top head set, he starts the machine and runs the piece in until it reaches the first side head. Then he proceeds setting the side head, and so on until the machine is set. Usually he does a lot of tinkering before the molding is just right. Anywhere from one and a half to three hours is required in setting up, depending on the character of the molding and his luck. Fortunately, though, he does not have to set up this way often. It is necessary only on rare occasions, where there is no templet in stock for the molding; all other times he sets up with templets. If this molding were run with the face side up, setting up would be much simpler. But in running many thousand feet with one setting, the method described is by far the best.

The templets used are made mostly from white pine. All other woods are sometimes used, but white pine stays the straightest. The last piece of stock is left in the machine, unless a white pine templet is desired. It is then taken out after both ends have been cut off even with machine. In setting up for this molding again this piece (templet) is used to set up with. It is shoved into machine, and everything, as nearly as possible, fixed same as it was when taken out. The knives are then set accordingly.

In planing mills and similar factories, where absolute accuracy is not necessary, and where the moldings are taken from details and blueprints, and seldom worked twice, the foregoing system would never do. But in factories where the same mold is often worked in large quantities, and absolute accuracy is necessary, this method, since I have become better acquainted with it, has more good points than I at one time thought it had For example: There is not a stickerman in the business, no matter how experienced and expert he may be, who can set up a sticker with gages, for a mold like Fig. 2, for instance—a simple mold—and have the first piece come out of the machine absolutely accurate. I mean to set up as I described, so that the bottom head cuts the face, and only cuts as much as is absolutely necessary. It is, I think, impossible. With the templet, however, the knives are set right to the mold, and with a little experience one soon becomes able to have the first piece come out absolutely accurate. So far as time is concerned, the templet way is the quickest, where the molding is a complicated one. Where the molding is simple, gages are just as fast.

I do not wish to be understood as saying the templet way is the quickest way of setting up a sticker. It must not be forgotten that when setting up from a sketch, no templet is available. The machine must first be set up with gages, or some other method, before a templet can be made. It is then, if the molding is a complicated one and to be worked often in the future, that the templet comes in handy. In setting up from blueprints, sketches, patterns, etc., for moldings that have never been worked before and are likely never to be worked again, gages are undoubtedly the best and quickest way.

One large molding factory I know of has a room fully 30 x 100 ft., in which nothing but templets are kept. Every time a new molding is made a templet is also made. The templet is then numbered, the number filed, and the templet put into a rack. When this molding is made again, the templet is easily found and is given to the stickerman, together with the knives, which, in most cases, have also been numbered and filed. When the molding is of such character that the face side cannot be run with the bottom head, a special pressurebar is made for it. This bar is then tied to the templet.

These molding factories vary in size. Some have but three stickers; one concern I know has thirty-two. But whether they have two or fifty stickers, they have all adopted one method—the templet method.

An English house, 700 years of age, has recently been torn down. The lumber in it was in good state of preservation. The interior woodwork was of oak, sycamore and yew.

A German technical journal, in discussing band saws, makes the statement that the thickness of the belt should be 1-1000 of the pulley diameter, "as in this way we get the proper proportions between pulleys and saw belts, which insure the proper tension and bending factors."

Tests show that wire-bound boxes are the strongest, while nailed boxes come next and dovetailed boxes are third, the dovetailed boxes with thin ends giving way very easily in the tests. In the nailed boxes the several sources of weakness were the single piece ends, which failed by splitting and the tendency of the nails to pull out easily when driven into the end of the wood. The conclusion is that a nailed box in order to show the maximum of strength for a given heaviness of construction should have cleated ends so arranged that the nails holding the bottoms and sides could be driven into cleats of red gum or some other wood which will resist the withdrawal of nails. The report does not contemplate the advisability of avoiding this trouble by using a roughened or barbed nail, which apparently might prove efficient in remedying this weakness.

Aesop Up-to-Date

Fables nowadays are told as new items. They may not be true, but, as the Italian saying goes, "they ought to be."

A merchant met a farmer carrying an express package from a Chicago mail-order house. "Why didn't you buy that bill of goods from me?" he asked, "I could have saved you the express charges, and, besides, you would have been patronizing a home store."

The farmer looked at the merchant for a full minute and then said: "Why don't you patronize your home paper and advertise? I read them and did not know you had this particular line."

In lieu of moral, this comment is made:

The retailer thinks that the business of his territory belongs to him, and so it does; but the same kind of support you expect from the farmer you should be willing to extend to your local publisher.

There are a few insects which attack some species of growing trees, and a few which work in some kinds of dry lumber, but the large loss from insects, which are estimated to do $30,000,000 damage annually, is from attacks upon dead or down timber or logs while still green. An ordinary log will take two or three years to season, and before that time borers will have riddled it. Logs are usually stored in ponds, where carried over more than one season, to prevent insect ravage, though for a year or two some species of woods are safe out of the water. The kiln-drying lumber kills all insect life and practically all fungous spores.

The News—From Coast to Coast

A. A. Tuttle, sash and door manufacturer, Moncton, N.B., died recently.

The Coast Cooperage Company, of Vancouver, B.C., is discontinuing business.

A sash and door factory will shortly be established at St. Agathe des Monte, Que.

There is a probability of a broom factory for the blind being established in Ottawa in the near future.

A slight fire occurred at Phillips Planing Mill, Toronto, recently, but fortunately the damage was slight.

Cushing Bros., Limited, of Calgary, Alta., have been granted a provincial charter in British Columbia.

A fire recently destroyed the main plant of the Wood Mosaic Flooring Company, of New Albany, Indiana.

A recent fire did $1,400 damage to the property of the National Automobile Woodworking Company, of Toronto.

The Canadian Government has supplied 25,000,000 tree seedlings to farmers in the plain region of Alberta and Saskatchewan.

Excavation has been started for the foundation of the new peg and woodenware factory of G. E. M. Lewis, at Truro, N.S.

The land, buildings and machinery of the Sackville Woodworkers, Limited, of Sackville, N.B., have been sold to J. A. Hicks.

Ernest Seitz, an employee at the Laidlaw Lumber Company's planing mill, Toronto, recently lost three fingers while at work.

The Sable Lumber Company's box factory at Wilkins Siding, N.S., was destroyed by fire on August 1st and 300,000 feet of lumber also burned.

The Northern Veneer Company, Limited, has been organized with a capital stock of $200,000. The head office will be situated at Grimsby, Ontario.

The Globe Casket Company of London, Ontario, is considering the purchase of woodworking equipment. Jno. Ferguson is president of the company.

The B. C. K. Logging Company, Limited, has been organized at Vancouver, B.C., with a capital of $10,000. They will conduct a saw and planing mill business.

Fire broke out at the box factory of Adam Beck, at London, Ontario, recently, and the damage to dry kiln and plant is estimated to be in the neighborhood of $10,000.

The mill and planer of the Standard Lumber Company, of Cranbrook, B.C., was totally destroyed by a recent fire, the loss being about $35,000, partly covered by insurance.

A planing mill to cost some $2,000 is shortly to be erected in Hamilton by the Consumers Lumber Company. It will be of cement block construction and concrete foundation.

Fire recently broke out in the dry kiln of the planing mill of S. R. Hughes, Portland street, Toronto. About $1,000 damage was done to the building and $500 to the contents.

Foundations have been completed for the $40,000 implement factory of the Tenn Manufacturing Company, Limited, at Regina, Sask. The building will be two storeys, 113 x 80 feet.

The Victoria Mills, Fredericton, N.B., have been completely remodelled and a planing mill plant added. Including all its departments the mill employs upwards of one hundred men.

The walls are going up for a new furniture factory for the D. H. Hibner Furniture Company, Berlin, Ont. The building will be three storeys, 67 x 80, reinforced concrete construction.

The J. H. Sherrard Manufacturing Company, Limited, has been organized with head office in Toronto and a capital stock of $750,000. They will carry on a furniture manufacturing business.

Ruth, Warren & Carroll, Limited, has been organized with a capital stock of $25,000. The head office is to be situated at Salmon Arm, B.C. They will conduct a furniture manufacturing business.

Nagle & Mills, of Ingersoll, Ontario, suffered a fire loss recently when a frame storehouse in the rear of their planing mill was burned, together with its contents. The loss is covered by insurance.

The main section of the plant of the West-Side Lumber Company at Dayton, Ohio, was recently destroyed by fire, with a loss of some $350,000. In this section of the plant all woodworking and cabinet making was done.

The sash and door factory and woodworking mill of M. P. Hogan, at Charlottetown, P.E.I., was recently totally destroyed by fire with a loss of some $20,000, with no insurance. The fire is supposed to be of incendiary origin.

John C. Mundell Company, Limited, has been organized with a capital stock of $300,000. The head office of the company will be at Elora, Ontario. They will manufacture household and office furniture and store fixtures.

Ottawa has obtained another lumber manufacturing plant, L. MacLean, of Montreal, who runs a flooring and roofing manufacturing plant in that city, having decided to establish a branch there in the old Warnock mill, Ottawa being chosen on account of its shipping facilities.

Tenders have been called for the erection of a $40,000 factory at St. Catharines, Ontario, by the Armstrong Cork Company, of Pittsburg, Pa. The building is to be one storey, with concrete foundation, frame and galvanized iron construction, electric light, fan system, heating, etc.

The St. John, N.B., board of trade believes that a large furniture manufacturing plant at St. John would prove a success, and has sent its industrial commissioner to New York to attend a great convention of furniture makers and endeavor to interest some of them in St. John as a desirable location for a large plant.

Plans are in progress for a new $25,000 sash and door factory for Nap. Sarrasin & Fils, Ltd., at Montreal. All kinds of machinery for a sash and door factory are required. The building will be 80 x 110 feet, hollow brick, frame, mill construction, fireproof, felt and gravel roof, electric light, hot water heating and sprinklers.

Fire recently caused about $30,000 damage to the planing mill of the Crows Nest Pass Lumber Company, at Wardner, B.C. The loss is covered by insurance. The planer had a capacity of about 200,000 feet daily and employed about twenty-five men. The company will immediately commence the erection of a new plant on the site of the old one.

Excavation has been begun for the foundations in a new factory of the Stewart-Heartshorn Company, Toronto. The building will be one storey, 38 x 82 feet, brick construction and foundation, felt and gravel roofing, electric light, steam heating, wire glass, skylights, metal sash and fireproof doors. The dry kilns will be installed by the Grand Rapids Veneer Works, of Grand Rapids, Mich.

Logging operations in the coast district of British Columbia during the second quarter of the present year, according to reports by the inspectors, showed a cut of 240,000,000 feet of logs, as compared with 218,000,000 feet for the corresponding period of last year. A conservative estimate

for the entire province would be about 325,000,000, a remarkable showing in view of the unsatisfactory state of the lumber trade.

The dispute concerning the freight rates of the Intercolonial Railway will probably be settled within a few days. Conferences have been taking place between the Minister of Railways and Canals, the railway officials, and representatives of shippers. Concessions have been made by the railway authorities, mainly in the direction of making allowance for contracts based on lower rates. Other rates have been slightly modified, but the general increase will be about ten per cent.

The building record by provinces shows that only the Maritime and Ontario cities showed an aggregate increase during July. An 87 per cent. advance made by the two chief cities of the Maritimes and a 38 per cent. increase by nineteen cities of Ontario bespeaks a substantial development in these provinces, while the remainder exhibit a marked tendency to ease up. In British Columbia cities the decrease for the month was 77 per cent.; that for Saskatchewan cities, 63 per cent.; Manitoba, 51 per cent., and Alberta 23 per cent.

L. W. Hookham has recently started a woodworking and cabinet manufactory at Port Coquitlam, B.C. The new plant will turn out all kinds of show cases, wood mantels, furniture and ornamental stair work and will give steady employment to about ten men. The proprietor has had lengthy experience in this particular line of work both in Canada and the Old Country, and for the past five years was employed as designer with Woodcrafts, Limited, Calgary. The new factory is 65 ft. x 24 ft., with a full size basement underneath.

The Medicine Hat Planing Mill, Limited, of Medicine Hat, Alberta, has recently been incorporated with a capital stock of $50,000. The plant occupies two acres of ground in the industrial division of the city and has all the necessary conveniences, such as gas, water, electricity and trackage. The machine shop is 50 x 80 feet with cement floor, the bench room 20 x 80 feet, the kiln 20 x 30 feet and the shed 40 x 60 feet. It also has a separate office building 12 x 20 feet. The mill is equipped with the latest machinery for the manufacture of sash, wood veneer and special planing mill work.

In order to forestall the destructive borers and prevent the loss of valuable material, the Ontario Department of Lands, Forests and Mines has decided to sell the timber on certain lands burned over by the recent forest fires. Tenders will be received until August 26th for the timber on lots 9, 10, 11 and 12 in the second concession of the Township of Dana. For timber on berth G71, north of Rainey River, tenders will be received until August 19th. A sale of the timber will also be held. It is located on berth G7, on Jackfish Lake, north of Rainey River, where the pine has been cut. Tenders will be received until August 6th.

The first storey of the new addition to the factory of the Elmira Furniture Company, Limited, has just been completed. The new addition is 50 x 100 feet and three storeys high, brick and mill construction, and will cost $20,000 with equipment. At the present time the company will not require any new machinery, having recently installed a few new and up-to-date woodworking machines, and the new building will simply give more space to the machine department. The company manufacture a line of den furniture, mission rockers and chairs, parlor rockers and chairs, library and parlor tables, together with a big line of diners in the medium grades of quartered oak and mahogany.

The $3,000,000 merger of the casket manufacturers of Canada has been completed under the name of the Dominion Manufacturers, Limited. The factories composing the organization are the National Casket Company, and D. W. Thompson Company, of Toronto; the Semmens & Evel of Hamilton and Winnipeg; the Globe Casket Company of London, Ont.; Jas. S. Elliott & Son, Prescott, Ont.; Girard & Godin, Three Rivers, Que., and Montreal, and Christie Bros. & Company, of Amherst, N.S. The officers of the new company are: President, Lorne C. Webster, Montreal; vice-president, W. M. Marshall, Toronto; general manager, T. W. Coles, of the Globe Casket Company, London; directors, W. J. McConnell, Montreal; A. J. H. Eckhardt, Toronto; Mr. Ivery, London, and Mr. Godin, Three Rivers, Que.

The B. F. Sturtevant Company of Canada, Limited, have arranged for a plant in Galt, Ont., from which they will handle their Canadian business and also export to England, Australia and foreign countries. The property in question is such that the manufacturing and assembling of the more important lines produced by the company can be started almost immediately and arrangements have been made providing for a growth up to ten acres of plant. Salesmen are already located to cover Montreal, Toronto and Vancouver sections and offices will soon be established in each of the principal Canadian cities. The manufacturing, engineering and sales will be handled by men trained by the B. F. Sturtevant Company of Boston, and the general policy of that company, who manufacture high grade material for the best class of trade, will be carried out. Some of the most important apparatus which will be built are fans and blowers, planing mill exhausters, propeller fans, heating and ventilating apparatus, fuel economizers, mechanical draft, steam turbines, vertical engines, generating sets and stokers.

WOODWORKING MACHINERY

More than 1,000 Second-hand Machines, Renewed and Guaranteed.

Section of main floor Exhibit and Salesrooms

52 Lines of New Machinery the Largest Stock in the World.

CHICAGO MACHINERY EXCHANGE, Inc., 1219-1227 Washington Blv'd. CHICAGO, Ill., U. S. A.

Practical Books for Woodworkers

Problems in Furniture Making, by F. D. Crawshaw. Elementary. Deals ably with questions of design, construction and wood finishing. 58 pages, illustrated. Price $1.00.

Expert Wood Finisher, by A. Ashmun Kelly. Describes woods used by finishers, explains fillers and filling, fuming and finishing, stains, formulas, troubles and defects, general information and a glossary. 340 pages. Price $3.00.

Glue Handling, by Friman Kahrs. A dozen chapters of general information on glue, glue handling, errors in factory testing, glue qualities, etc. Price $1.00.

Saw Fitting Manual, a Treatise on the Care of Saws and Knives. Deals with everything in the saw and knife alphabet, from Adjustments to Widths. 144 pages. Price $2.00.

Progressive Carpentry, by H. D. Meloy. Results of a study of all known methods of construction. Many valuable improvements sent forth and explained, including a system of framing roofs. 80 pages, illustrated. Price $1.00.

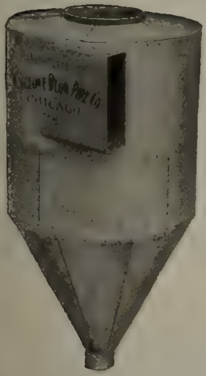
The Art and Craft of Cabinetmaking, by D. Denning. Chapters on the distinction between cabinetmaking and joinery; development of furniture, glue, veneering, table construction, drawing and designing. 320 pages, illustrated. Price $1.50.

Wood-turning, by George H. Resides and Hugo Diemer, M.E. Deals with woodworking and with patternmaking, describes standard types of woodworking machinery with particulars of their operation. 160 pages, illustrated. Price $1.50.

Send your orders to

Woodworker Publishing Company, Limited

Nicholls Building, Toronto



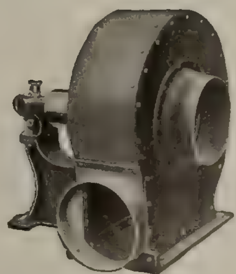
(Patented)

Cyclone Blow Pipe Co.

Improved Cyclone Dust Collectors, Automatic Furnace Feeders, Steel Plate Exhaust Fans, Exhaust and Blow Piping.

Complete systems designed, manufactured, installed and guaranteed. Old systems remodeled on modern lines on most economical plans. Supplementary system added where present systems are outgrown. Defective systems corrected and put in proper working order.

Latest Improved Slow-Speed Systems



Cyclone Blow Pipe Co., Chicago, Ills.

BUYER'S DIRECTORY

AUTOMATIC DOVETAIL GLUE JOINTER
Canadian Linderman Machine Co., Ltd., Woodstock, Ont.

AUTOMATIC GLUE CLAMP CARRIER
Nels J. Billstrom, 1315 Tenth street, Rockford, Ill.

BABBITT METALS
Shurly Dietrich Co., Ltd., Galt, Ont.
Fay & Egan Co., Cincinnati, O.
Canada Metal Co., Ltd., Toronto.

BALUSTER LATHES
C. Mattison Machine Works, Beliot, Wis.
Thos. White & Sons, Paisley, Scotland.
Chicago Machinery Exchange, Chicago, Ill.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.
Canada Machinery Corp., Ltd., Galt, Ont.

BAND SAW FILING MACHINERY
Shurly Dietrich Co., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

BAND SAWS
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Shurly Dietrich Co., Ltd., Galt, Ont.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
R. H. Smith Co., Ltd., St. Catharines, Ont.

BAND SAW MACHINERY
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
H. W. Petrie, Ltd., Toronto.

BAND SAW MILLS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., Cincinnati, Ohio.

BAND SAW STRETCHERS
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

BENDING MACHINES
Fay & Egan Co., Cincinnati, Ohio.

BELTING
J. A. Fay & Egan Co., Cincinnati, Ohio.
Sadler & Haworth, Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
H. W. Petrie, Ltd., Toronto.

BELTS (Endless)
Candada Machinery Agency, Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Sadler & Haworth, Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
H. W. Petrie, Ltd., Toronto.

BELT CEMENT
Sadler & Haworth, Montreal.

BELT FASTENERS
Sadler & Haworth, Montreal.

BELT DRESSING
Sadler & Haworth, Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

BLOWERS
Sheldons Limited, Galt, Ont.
H. W. Petrie, Ltd., Toronto.

BLOW PIPING
Cyclone Blow Pipe Company.
Sheldons Limited, Galt, Ont.

BOILERS
Canada Machinery Agency, Montreal.
H. W. Petrie, Limited. Toronto.

BORING MACHINES
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Mussens, Limited, Montreal.
J. M. Nash, Milwaukee, Wis.
Valley City Machine Works, Grand Rapids. Mich.
H. W. Petrie, Limited, Toronto.

BOX MAKERS' MACHINERY
Canadian Linderman Co., Ltd.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.

BROKEN CASTINGS BRAZED—MACHINIST AND DIE MAKER
W. H. Dunne, 1492 Queen St. West, Toronto.

CABINET PLANERS
Canada Machinery Corporation, Ltd., Galt, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Agency, Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Valley City Machine Works, Grand Rapids, Mich.
Baxter D. Whitney & Son, Wichendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Ltd., Toronto.

CARS (transfer)
Sheldons Limited, Galt, Ont.

CARVING MACHINES
Canada Machinery Corporation, Ltd., Galt, Ont.
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Hespeler Machinery Co., Ltd., Hespeler, Ont.
Valley City Machine Works, Grand Rapids, Mich.

CHISELS
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

CIRCULAR SAW MILLS
Canada Machinery Agency, Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
H. W. Petrie, Limited, Toronto

CHAINS (Silent)
Jones & Glassco, Montreal

CLAMPS (Chain, Carpenter, Cabinet, Pattern Makers, Bench, Mitre, Piling, Mounted and Rotary Wheel)
Batavia Clamp Company, Batavia, N.Y.
Black Bros. Machinery Co., Mindota, Ill.
J. A. Fay & Egan Co., Cincinnati, Ont.

CLAMPS (Saw)
Shurly Dietrich Co., Ltd., Galt, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

CLUTCHES
J. A. Fay & Egan Co., Cincinnati, Ohio.

COLUMN CLAMPS
Black Bros. Machinery Co., Mendota, Ill.

COLUMN MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.

CORE BOX MACHINES
J. A. Fay & Egan Co., Cincinnati, Ohio.
Chicago Machinery Exchange, Chicago, Ill.
E. & B. Holmes Machinery Co., Buffalo, N.Y.

CUT-OFF SAWS
Canada Machinery Corporation Ltd., Galt, Ont.
Shurly Dietrich Co., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Berlin Machine Works, Ltd., Hamilton, Ont.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

CUTTER HEADS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Lamson Cutter Head Company.
Samuel J. Shimer & Sons, Galt, Ontario.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

DADO HEADS
C. Mattison Machine Works, Beloit, Wis.
Fox Machine Company, Grand Rapids, Mich.
W. A. Elliott, Bathurst and College Sts., Toronto.

DIEMAKERS & MACHINISTS
W. H. Dunne, 1492 Queen St. West, Toronto.

DISK GRINDERS
J. A. Fay & Egan Co., Cincinnati, Ohio.

DOGS (Saw Mill)
J. A. Fay & Egan Co., Cincinnati, Ohio.

DOVETAILING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canadian Linderman Machine Co., Ltd., Woodstock, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

DOWEL MACHINES
Thos. White & Sons, Paisley, Scotland.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Dauber-Bell Machine Company.
J .A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Valley City Machine Works, Grand Rapids, Mich.

DRYING MACHINERY
Sheldons Limited, Galt, Ont.
Morton Dry Kiln Co., Chicago, Ill.

DRY KILNS
Sheldons Limited, Galt, Ont.
Morton Dry Kiln Company, Chicago, Ill.

DUST COLLECTORS
Sheldons Limited, Galt, Ont.

DUST SEPARATORS
Sheldons, Limited, Galt, Ont.

EDGERS (Gang)
Berlin Machinery Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

EDGERS (Single Saw)
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Agency, Montreal.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

END MATCHING MACHINE
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

ENGINES (Steam)
H. W. Petrie, Limited, Toronto.

EXHAUST FANS
Sheldons, Limited, Galt, Ont.

FLOORING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corporation, Ltd., Galt, Ont.
Baxter D. Whitney & Son, Winchendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

FLINT
Wausau Quartz Co., Wausau.

FLUTING HEADS
J. A. Fay & Egan Co., Cincinnati, Ohio.

FLUTING AND TWIST MACHINE
Pryibil Machine Co., P., New York.

GAINING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Canada Machinery Corporation, Ltd., Galt, Ont.
H. W. Petrie, Limited, Toronto.

GAS ENGINES
H. W. Petrie, Limited, Toronto.

GAUGES (Saw)
Shurly Dietrich Co., Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver B. C.

GLUE CLAMPS
Batavia Clamp Company, Batavia, N.Y.
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.

GLUE HEATERS
J. A. Fay & Egan Co., Cincinnati, Ohio.

GLUE JOINTERS
Canada Machinery Corporation, Ltd., Galt, Ont.
Canadian Linderman Company, Limited, Woodstock, Ont.
Chicago Machinery Exchange, Chicago, Ill.

GLUE SPREADERS
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

GRINDERS (Cutter)
J. A. Fay & Egan Co., Cincinnati, Ohio.

GRINDERS (Knife, etc.)
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

GRINDERS (Tool)
J. A. Fay & Egan Co., Cincinnati, Ohio.
Valley City Machine Works, Grand Rapids, Mich.

GROOVING HEADS
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Samuel J. Shimer & Sons, Milton, Pa.
Canada Machinery Corporation, Ltd., Galt, Ont.

HAND PROTECTORS
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Jones Safety Device Co., Hamilton, Ont.

HAND SCREWS
Black Bros. Machinery Co., Mendota, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

HEATING APPARATUS
Sheldons, Limited, Galt, Ont.

HANDLE AND SPOKE MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
J. M. Nash, Milwaukee, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.

HUB MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

HYDRAULIC VENEER PRESSES
Wm. R. Perrin & Co., Ltd., Toronto.

INJECTORS
H. W. Petrie, Limited, Toronto.

JOINTERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canadian Linderman Co., Ltd., Woodstock, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Plessisville Foundry, Plessisville, Que.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

KNIFE GRINDERS
Rogers & Coampany, Samuel C.

KNIVES (Planers and Others)
Shurly Dietrich Co., Ltd., Galt, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Samuel J. Shimer & Sons, Milton, Pa.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
H. W. Petrie, Limited, Toronto.

LACE LEATHER
Sadler & Haworth, Montreal.

LATHES (Pattern Makers')
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Valley City Machine Works, Grand Rapids, Mich.
H. W. Petrie, Limited, Toronto.
Thos. White & Sons, Paisley, Scotland.

LATHES (Turning)
Berlin Machine Works, Lid., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Valley City Machine Works, Grand Rapids, Mich.
Baxter D. Whitney & Son, Winchendon, Mass.
H. W. Petrie, Limited, Toronto.

LOOSE PULLEYS
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corporation, Ltd., Galt, Ont.

LUBRICANTS AND GREASES
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.

LUMBER
Anderson Lumber Company, C. G.
Elgie & Jarvis, Toronto.
Oliver Lumber Company, Toronto, Ont.

MACHINE KNIVES
Walters & Sons, H., Hull, Que.

MITRE MACHINES
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N. Y.
H. W. Petrie, Limited, Toronto.

MITRE SAWS
Shurly Dietrich Co., Ltd., Galt, Ont.
E. C. Atkins & Co., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corporation, Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

MITRE CLAMPS
Batavia Clamp Company, Batavia, N.Y.
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.

MORTISING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Jones & Glassco, Montreal.
Valley City Machine Works, Grand Rapids, Mich.
H. W. Petrie, Limited, Toronto.

MOTORS
J. A. Fay & Egan Co., Cincinnati, Ohio.

MULTIPLE BOXING MACHINES
J. A. Fay & Egan Co., Cincinnati, Ohio.
J. M. Nash, Milwaukee, Wis.

PACKINGS
Both Felt Company

PAINTS AND VARNISHES
Jamieson & Co., R. C., Montreal.

PATTERN SHOP MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

PICTURE FRAME MACHINERY
Black Bros. Machinery Co., Mendota, Ill.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.

PLANES
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corp., Ltd., Galt, Ont.

PLANERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.
Porter Mach. Co., C. O., Grand Rapids, Mich.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

PLANING MILL MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Chicago Machinery Exchange, Chicago, Ill.
C. Mattison Machine Works, Beloit, Wis.
Pryibil Machine Co., P., New York, N.Y.
Samuel J. Shimer & Sons, Milton, Pa.
Baxter D. Whitney & Son, Winchendon, Mass.
Black Bros. Machinery Co., Mendota, Ill.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie Co., Ltd., Toronto.

POLISHING MATERIAL
Gray & Company, H.

PULLEYS
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

RESAWS
Shurly Dietrich Co., Ltd., Galt, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

RESAWS
H. W. Petrie, Limited, Toronto.

RIM AND FELLOE MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corp., Ltd., Galt, Ont.

RIP SAWING MACHINES
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Canada Machinery Corp., Ltd., Galt, Ont.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

SAFETY GUARDS (For Band Saw Machines, Jointers, Rip Sawing Machines, Shapers, Swing Saws, etc.)
Chicago Machinery Exchange, Chicago, Ill.
Fair Manufacturing Company, Racine, Wis.
Jones Safety Device Co., Hamilton, Ont.

SANDERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
J. M. Nash, Milwaukee, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Fisher Sander Co., Berlin, Ont.
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.
Elliot Woodworker Co., Toronto.

SANDPAPER
Black Bros. Machinery Co., Mendota, Ill.

SANDERS (Moulding, Belt and Panel)
Black Bros. Machinery Co., Mendota, Ill.
Chicago Machinery Exchange, Chicago, Ill.
H. W. Petrie, Ltd., Toronto.

SASH, DOOR INTERIOR TRIM AND COLUMNS
M. Brennan & Sons, Hamilton, Ont.

SASH, DOOR AND BLIND MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Samuel J. Shimer & Sons, Milton, Pa.
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.

SAWS (Hand)
Shurly Dietrich Co., Ltd., Galt, Ont.
E. C. Atkins & Co., Hamilton, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

SAW MILL MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
H. W. Petrie, Limited, Toronto.

SAW SWAGES, AUTOMATIC FILERS
E. C. Atkins & Co., Hamilton, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.

SAW TABLES
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

SCRAPING MACHINES
Baxter D. Whitney & Son, Winchendon, Mass.
Chicago Machinery Exchange, Chicago, Ill.

SCROLL SAWS
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Shurly Dietrich Co., Ltd., Galt, Ont.
E. C. Atkins & Co., Hamilton, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.

SECOND HAND MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
H. W. Petrie, Limited, Toronto.

SHAPERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Samuel J. Shimer & Sons, Milton, Pa.
Baxter D. Whitney & Son, Winchendon, Mass.
H. W. Petrie, Limited, Toronto.

SHAVING COLLECTORS
Ormsby Company, A. B., Toronto.
Sheldons, Limited, Galt, Ont.

SINGLE SPINDLE BOXING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.

STAVE SAWING MACHINE
Baxter D. Whitney & Son, Winchendon, Mass.

STORE FIXTURES, FITTINGS
Reflector & Hardware Specialty Mfg. Co. Chicago, Ill.

SURFACERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.
Chicago Machinery Exchangefi, Chicago, Ill.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

SWING SAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

TABLE LEG LATHES
Berlin Machine Works, Ltd., Hamilton ,Ont.
Chicago Machinery Exchange, Chicago, Ill.
Thos. White & Sons, Paisley, Scotland.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.

TENONING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
H. W. Petrie, Limited, Toronto.

TOOLS (Hand)
J. A. Fay & Egan Co., Cincinnati, Ohio.
Samuel J. Shimer & Sons, Milton, Pa.

TRIMMERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

TRUCKS
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Sheldons, Limited, Galt, Ont.

TURNING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.
H. W. Petrie, Limited, Toronto.

UNDER-CUT SELF-FEEDING FACE PLANER
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.

GUMMERS, ETC.
E. C. Atkins & Co., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

UNIVERSAL WOODWORKER PLANER
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
W. A. Elliot, Bathurst St., Toronto, Ont.
H. W. Petrie, Limited, Toronto.

VENTILATING APPARATUS
Sheldons, Limited, Galt, Ont.

VENEER DIERS
Sheldons, Limited, Galt, Ont.

VENEER PRESSES (Hand and Power)
Hydraulic Press Mfg. Co., Mount Gilead, Ohio.
Black Bros. Machinery Co., Mendota, Ill.
William R. Perrin & Company, Toronto, Ont.

VISES (Band Saws)
Shurly Dietrich Co., Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
H. W. Petrie, Limited, Toronto.

VISES (Pattern Makers')
J. A. Fay & Egan Co., Cincinnati, Ohio.

VISES (Circular Saws)
E. C. Atkins Co., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
H. W. Petrie, Limited, Toronto.

WAGON AND CARRIAGE MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.

WASHERS
Booth Felt Company

WASTE, COTTON
Gray & Company, H.

WIPING MATERIAL
Gray & Company, H.

WINDOW FRAME MACHINERY
Smith & Phillips Mfg. Co., Chicago, Ill.

WOOD PULLEYS
Canada Machinery Agency, Montreal.

WORK BENCHES
Canada Machinery Agency, Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.

MORTON MOIST AIR DRY KILN

The Most Perfect Dry Kiln on the Market

The "Morton" has a reputation for drying oak, maple, birch and beech quicker and better and with less steam than any other method—excepting none.

Write for our New Catalog "W"

Morton Dry Kiln Co., Chicago, Ill.

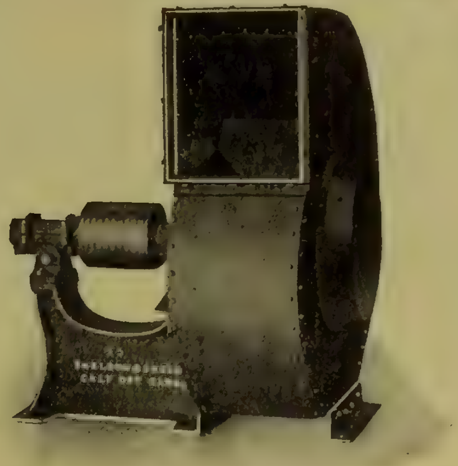
Furniture and Show Case Manufacturers and Builders

ATTENTION

We carry in stock a full line of Hardware Specialties for the manufacture of Show Cases, Counters etc., Furniture and Cabinets, Sash and Doors.

Our Catalog illustrates our numerous specialties and is complete with prices. Send us your name and address so we may send you one. We can very probably save you money on your present purchases.

The Reflector & Hardware Specialty Mfg. Co.
Western Ave. and Twenty Second Place, Chicago, Ill.



Slow Speed Steel Plate Fan

To obtain the Highest Efficiency in planing mills it is necessary you install the Sheldon Shaving Collecting System. Lowest speed and power consumption.

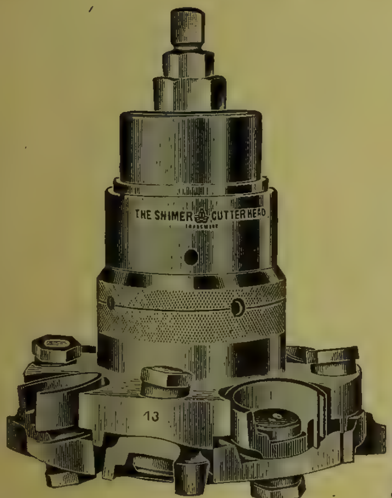
Write for the latest bulletin

SHELDONS LIMITED - Galt, Ont.
Toronto Office, 609 Kent Building

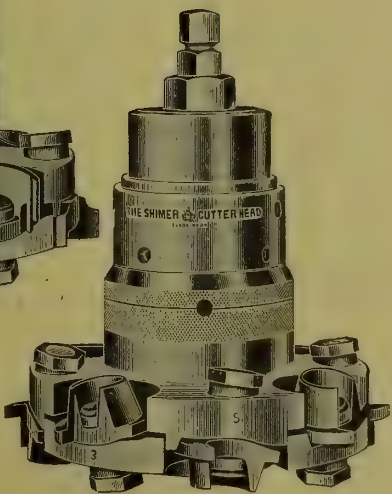
— Agents —

Ross & Greig, 412 St. James St., Montreal.
Grose & Walker, 259 Stanley St., Winnipeg.
Robert Hamilton & Co., Bank of Ottawa Bldg., Vancouver.
Gorman Clancey and Grindley Ltd. Calgary and Edmonton.

For Good Results and Safety



The Shimer Limited Grove Head with Expansion



The Shimer Limited Tongue Head with Expansion

Use the Shimer Limited Cutter Heads

made especially for fast feed matching machines. They will do good work at 150 to 180 lineal feet or more per minute and will be found to be safe and efficient tools to place in the hands of your workmen.

They have no delicate parts to break down or get out of order, are self-centered on the spindles by means of a self-centering and chucking device which grips firmly thereto when drawn up, requiring no set screws.

They are fitted with Shimer Long Life Circular Bits of large areal seat surface and held by special strong holding bolts.

Price, net, in solid section, complete for making flooring \$67.00. With expansion feature like illustrations \$72.46 complete.

Samuel J. Shimer & Sons
Galt, Ont., Can.

Volume Thirteen TORONTO, SEPTEMBER, 1913 Number Nine

Canadian Woodworker

BEHIND THIS NAME THERE IS A RECORD OF ACHIEVEMENT SECOND TO NONE

Whitney Single, and Double Surface Planers

have for years been the standard of excellence in planing machines.

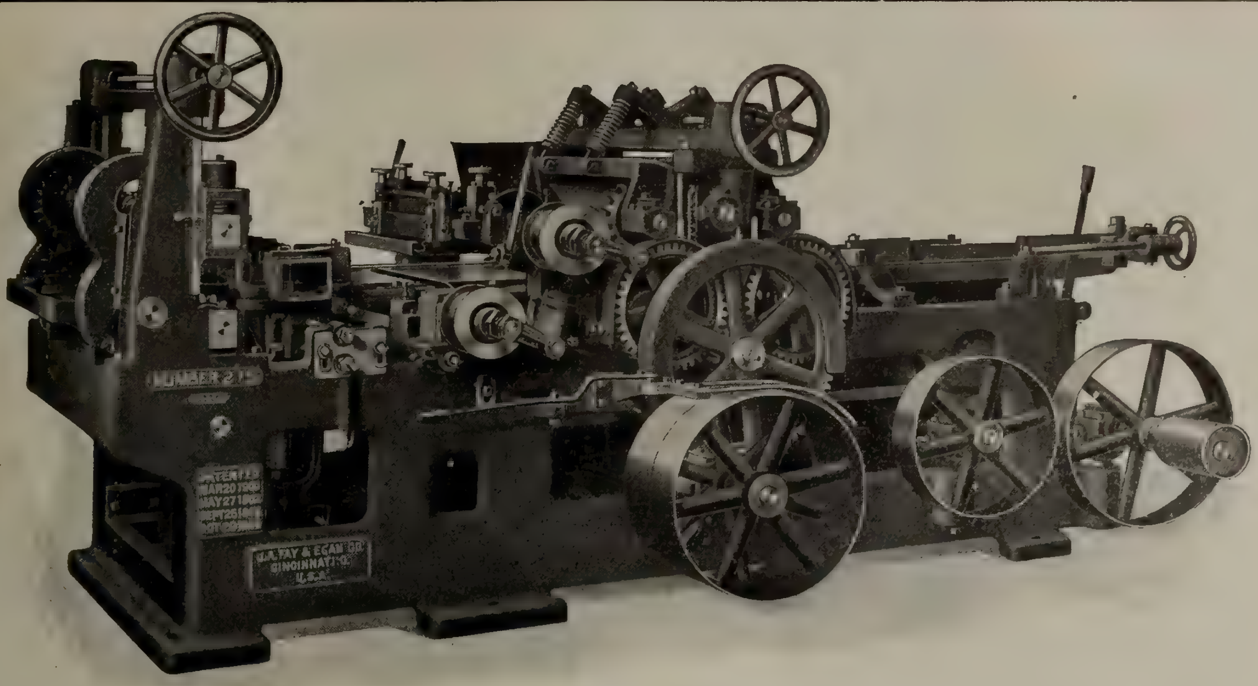
There is no better verification of what we say than the authoritative statements of those leading wood-workers who found that installing a Whitney brought them increased output and smooth, even surfacing produced at the low notch cost.

Why not take up the matter with us at once with a view to determining why a Whitney, equipped to suit your planing, either with square cylinder and two or four ordinary knives, or with round cylinder and four thin high-speed steel knives; with sectional rolls and steel sectional chip breaker or flexible steel chip breaker,—is better than any other.

Baxter D. Whitney & Son, Winchendon, Mass.

Pacific Coast Sales Department: H. H. Plummer, Mgr.
Pacific Building, Seattle, Wash.

Agents: Henry Kelley & Co.
26 Pall Mall, Manchester, England.



Actual Results that are Convincing– read what FAY-EGAN "LIGHTNING" No. 275's are doing

HEAVY WORK IN LOUISIANA

"We have dressed timbers as large as 6 x 8-inch on your No. 275 16-inch Matcher, and must say it has in every way met our approval. It gives us pleasure to recommend it.
H. E. Buck Lumber Co., Lake Charles, La."

WORK THAT TESTS ANY MATCHER IN MICHIGAN

"We use your No. 275 on a variety of work, running from ¼ to 1½-inch soft wood to 3⅝ x 10½-inch oak and 4½ x 6⅝-inch hickory. We plane all this stock on four sides, sometimes taking a ½-inch cut with the side heads on oak 3⅝-inch thick. A large part of our work is planing and matching circular tank staves 1¼ x 4-inch. Machine has greater capacity than our men. We are entirely satisfied.
Rumely Products Co., Battle Creek, Mich."

FAST WORK ON ROOFERS IN N. CAROLINA

"Actual book records show we put 8,100,630 feet of roofers averaging 1 x 7-inch through a No. 275 24-inch Matcher in 1911. W. B. Gettys Lumber Co., Zebulon, N.C."

A VARIETY OF WORK IN GEORGIA

"We work all sorts of stock from ½-inch ceiling to sizing timbers 16 x 8-inch. In my 25 years experience, I have never seen its equal for the amount of work it will turn out. It has the most wonderful feed for its size and has not cost us a cent for repairs.
Shaw Bros., Macon, Ga."

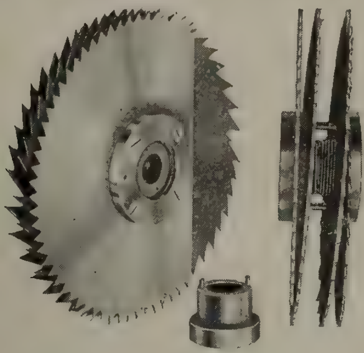
"Proof of the pudding is the eating"—The results can be verified, or we'll send bulletin describing the No. 275 in detail, and tell you where you can see one in operation.

J. A. FAY & EGAN CO.

153-173 W. FRONT ST. **CINCINNATI, OHIO, U.S.A.**

Trade **FOX** Mark

ADJUSTABLE



DADO HEADS

These heads, when open, cut a groove twice the width of groove cut with head closed, and they will cut absolutely any width between these extremes.

Write for Descriptive Literature

FOX MACHINE CO.
645 Front Ave., N.W., GRAND RAPIDS, MICH.

The M. Brennen & Sons Mfg. Co., Limited

LUMBER DEALERS, PLANING MILL

Manufacturers of Doors, Frames, Sash, etc.
Trim and all kinds of Mouldings

Detail Work a Specialty

Rough and Dressed Lumber, Lath and Shingles

We are always glad to Furnish Estimates.
Prompt delivery our Specialty. Write for Price Lists.

Box 107 HAMILTON, ONT.

Easy Money

The Profit on Window Frames.
The Machine Makes it for You

Because it does all this work cheaper and better than it can possibly be done by hand labor.

Machine does everything shown above.

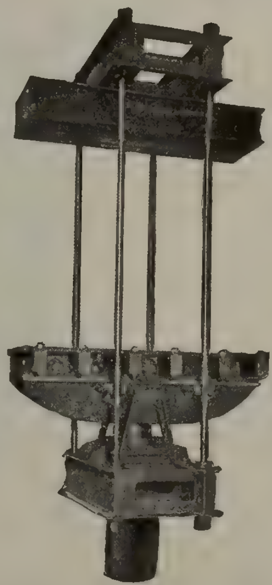
Because it enables you to fill your orders in one-tenth the time required for hand labor.

Smith & Phillips Mfg. Co.

412-422 N. Sangamon Street, CHICAGO, ILL.

Investigate our Stair Router, Edge Jointer, Sash Groover and Light Shaper. It is an excellent combination.

Hydraulic Veneer Press



We build these presses in all sizes and styles for all kinds of Veneer work

Write us for Price

William R. Perrin & Company
Limited
TORONTO

Canadian Woodworker

Canada's Only Woodworking Paper

Published in the interests of Planing Mills, Saw Mills, Furniture and Piano Factories, Implement and Carriage Works, Boxmakers and Coopers, Carpenters and Builders.

The Circulation extends from the Atlantic to the Pacific and covers thoroughly all classes of Woodworkers in this immense territory.

Wooodworker Publishing Co., Limited

Nicholls Building Toronto, Canada

MONTREAL - - - - - - - - - Board of Trade Building
NEW YORK - - - - - - - - - - - Tribune Building
CHICAGO - - - - - - - - - - - 659 Peoples Gas Bldg.
LONDON, ENG. - - - - - - - - 3 Regent Street, S.W.

SUBSCRIPTION RATE.

Canada, United States, $1.00; Great Britain, Australia 4s 6d.; other countries $1.50 per year. Advertising rates on request.

Vol. 14 September, 1913 No. 9

A Philosophy of Handiwork

THE place of handwork in modern education and the revival which the woodworking industry, in common with other arts and crafts, is undergoing at the present time are the themes of a timely and valuable article by Francois Mentre in a French contemporary. The observations made by M. Mentre are valuable in that they reveal the true dignity of our industry and tend to place it upon a higher plane. We are in accord with the view that the conscientious practice of handwork has more than a strictly utilitarian value; that it brings physical, intellectual and moral benefits.

The observations made apply generally to handwork, but we may reasonably narrow down the arguments exclusively for the woodworking crafts.

Of recent years there has been a rather regrettable tendency to belittle the claims of a trade. In spite of the great constructional activity in Canada and the tremendous opportunities that are afforded skilled mechanics, the proportion of young men entering the building trades has been on the decrease. Why is this? It is because the rising generation has taken an exaggerated view of the value of book learning, which, after all, is the most disappointing kind of knowledge in the world.

Every man if he is so minded has the opportunity to study books, but not every man has the opportunity to practise a trade, for many have let the opportunity go by—and it comes once only. The practice of a good trade is rightly held to be valuable in that it diverts the attention "from matters that are purely intellectual and bookish." Generally our education is too symbolic and verbal; hence the astonishing failures we find in the realm of men who have distinguished themselves at college. In the practice of a trade both the mind and the body develop normally. Practical work places a man in immediate contact with nature and tends to produce natural habits. M. Mentre defines handwork as "a permanent lesson in determinism and an incomparable school of science." The definition is worth remembering.

The prejudice of inferiority that has existed against trades is dissipated rapidly by practical experience. A true craftsman discovers the moral efficacy of his trade in the demands that it makes of him. The woodworking industries in the highest plane are not satisfied with approximation. They require careful work properly executed and well finished. They emphasize the fact that work half done is only harmful.

In the last analysis, practical work well done brings to the craftsman a degree of satisfaction that is excelled in none of the so-called higher professions. Practical work furnishes a key to a world of great interest which remains a closed door to many engaged in other occupations.

Reflections such as these, we repeat, are timely and valuable. To the veterans in those honorable industries with which this paper is identified, they bring a measure of gratification and encouragement; to those who are electing to follow some branch of the woodworking trade, they suggest an ideal.

Trade Conditions—A Change for the Better

IN spite of the fact that a number of alarmist statements have been going the rounds during the last week or two, general trade conditions throughout the country are very satisfactory. Particularly in the west has a change in the direction of improvement taken place. Excellent crop prospects have inspired a strong feeling of confidence and money is becoming more plentiful. It may be asserted safely that with the garnering of a crop estimated at a value of nearly three hundred millions the financial stringency—if such it may be called—will soon have passed into history.

Reports from a number of western cities showed that August was a better building month than either June or July. Building records to date show that Calgary is having one of the most active years in its history in this respect. The permits issued up to the end of July were close on six million dollars and thousands of dollars' worth of new permits are still being issued daily. At the end of the present month the permits are expected to total seven millions.

Toronto particularly has been complaining of decreased activity in the building trades, as evidenced by the number of men idle. Here, however, we believe the conditions to be peculiar to a city which is becoming the eastern dumping ground for thousands of immigrants. Not only that, but lately there has been a large influx of men from outside points who have been attracted to the city by reports of higher wages obtained in several trades earlier in the year. We are confident that with the amount of construction work going on throughout Canada there is ample room for all. It is simply a problem of distribution—one that will solve itself very quickly.

The Man Who Makes Good

THE Los Angeles Builder and Contractor says that the man who makes good is the man who can shut out of his mind all but one thing. An unsuccessful principal of a school once said that every teacher ought to be able to do three things at once. Of course he was wrong. The teacher who does one thing at a time and does it well is giving the pupil the best object lesson in concentration.

We have to learn to think clearly amid distracting noises, to go forward on a straight and narrow way without diversions and excursions that waste our time

and our substance and to keep at work regardless of the "tired" feeling, the "spring" feeling, and whether the fishing is good or not. When the soft breeze comes in at the window we must stiffen the moral fibre against its allurement. We must pin our attention firmly to the turgid and dry geometry of a legal brief, or the serried figures of the day book, or the busy system of a mercantile establishment, and let every other thought await its turn at the end of office hours.

You may have heard a great lawyer in action in a crowded court room. What was the secret of his power? It was that he would not let the jury's attention or the witness' tongue wander from the relevant facts. He kept insistently to the straight line that is the shortest distance from point to point.

So every man's mind ought to work. It ought to fly like an arrow to the mark. It ought to seek always the pith and the marrow of an issue. It ought to be able to include the essential phases of every considerable matter and exclude the superfluous, the non-essential. That faculty is developed only by long and arduous training. The wordy, windy, vague individuals who cannot come to the point are many in number. The precise and concise ones are in the minority.

Victoriaville, P. Q.—A Thriving Town with a Thriving Industry

The Victoriaville Furniture Company

SITUATED midway between Montreal and the city of Quebec is the thriving town of Victoriaville—one of those places which in recent years has developed in a surprising degree. It has now a population of 4,000, not large it is true when compared with some of the other towns, but an indication of the industrial growth. Within the last 20 years, the population has tripled, and as more industries are likely to be established, a further growth may be looked for. It is a town where several factories manufacturing medium grade goods are located. One of the most important companies is the Victoriaville Furniture Company, founded in 1894 by the late Mr. D. O. Bourbeau and Mr. Paul Tourigny, now M.P.P. for Quebec, and for 17 years the Mayor of Victoriaville. The capital was $10,000, and the company had a hard time in establishing a business. The town was purely agricultural in character, and labor of the right kind was difficult to obtain, but the founders, with great tenacity, held on to the industry, and their efforts at least brought their reward. The company have gradually widened their borders, and in 1902 the capital was increased to $60,000. With additional money, further advances were made, and the company, besides paying a good dividend, have a reserve fund of over $75,000. The president is Mr. Paul Tourigny, M.P.P.; the vice-president, Dr. A. F. Poulin; manager and director, Mr. J. E. Alain; and directors, Messrs. A. Marchand and Aug. Bourbeau.

The company manufacture medium grade case goods, specializing on dressers, stands, chiffoniers, side-boards, and tables, which are finished in surface oak; and have now the largest trade in Canada in this class of furniture, a fact due almost entirely to concentration on the special lines. Although the goods are sold throughout the Dominion, the chief trade is done with the West. Within recent times the management have adopted the policy of installing the latest machinery, scrapping, if need be, the machines which are only a little behind the times. The great object is to secure appliances which will reduce the cost of labor, and to this may be attributed the financial succes of the company. The first cost of the new machinery may be heavy, but experience shows that it ultimately results in a material saving. The company have also adopted a cost system by which the cost of every article is ascertained to a cent, thus enabling track to be kept of any waste in the factory.

Another factor in the economical manufacture of the company's goods is the ownership of timber limits and saw mills. The limits, comprising 5,000 acres, contain principally birch; they are situated, with one of the mills, at Paul de Chester, some 15 miles from Victoriaville, the other mill being at Notre Dame de

The Victoriaville Furniture Company's extensive factory at Victoriaville, Que.

Varnishing Room, Victoriaville Furniture Company's Factory.

Ham. The lumber is cut by the company, fifty men being employed in the bush. At the mills the lumber is made into planks, and the slabs are resawn and manufactured into small pieces utilized in the factory. Work commences at the mill in September, and continues until June, the planks being stacked and air dried. In the winter, when the roads are good, the lumber is hauled to Victoriaville, so that by this system there is always sufficient lumber drying at the mills to meet all requirements. The mills cut about three million feet per annum; and in addition the company purchase about half a million feet of rotary birch veneer ¼-in. thick for drawer bottoms, back panels and bureau ends.

The factory (employing 150 men) contains about 70,000 feet of floor space, and consists of a ground floor and two flats. It is equipped with a sprinkler system, and around the building are three hose houses each equipped with a stand pipe, 50 feet of hose, and a lantern. There is also a tower containing 50,000 gals. of water. The office is on the ground floor and is a fine room, well furnished, and provided with some of the best appliances. Mr. Alain has an inner office.

The yard covers a large area, and always contains a minimum stock of one million feet of lumber. Adjoining the yard are the dry kilns, with a capacity of 100,000 feet, which is run to the full extent throughout the year. The kilns are on the moist air system of the National Dry Kiln Company, Indianapolis, Indiana, and consist of four sections, each capable of containing eleven trucks. The lumber remains 8 or 9 days in the kilns at a temperature of 150 or 160 de-

General Office of the Victoriaville Furniture Company.

grees F., the live steam being supplied by the boilers. After being dried, the stock is conveyed by the trucks, running on a track, to the machine shop, which occupies the main part of the ground floor. The shop contains the greater part of the wood-working machinery, where the rougher portion of manufacturing is done.

From the kilns the lumber goes direct to the breaking out saws, of MacGregor, Gourlay & Company's make, this firm supplying by far the greater portion of the plant. After being cut into proper lengths, the lumber is sent to three rip saws, where it is cut to the different widths required. One, a No. 281 Berlin, made by the Berlin Machine Works, Hamilton, is a very fine band rip saw, which is not only labour saving but does away with the element of danger in the hand rip saw. In addition to these machines, there are 3 rough planers and two jointers.

Undoubtedly the finest machine in the factory is the Linderman automatic jointer and gluer, supplied by the Canadian Linderman Company, Limited, Woodstock, Ont. This is 35 feet long, and weighs 12 tons. It is a wonderful labour saver, and also economical

Mr. J. E. Alain Managing Director Victoriaville Furniture Company.

from the point of utilizing every piece of lumber. It is fed from both ends, the resulting product being used for dresser, table, and other tops. When jointed and glued, the tops go to the sizing re-saw, which is in immediate proximity, and here the wood is cut to size, pieces remaining over being used again. Another interesting machine is the automatic leg lathe, the knives of which can be adjusted to carve any desired design. This machine is made by the Wood Turning Machine Company, of Detroit, Wis. The legs are afterwards sand-papered by machinery.

A multiple boring and mortising machine, supplied by the Wysong and Miles Company, Greenboro, North Carolina, does boring and mortising in one operation, and is so built that up to six heads can be used simultaneously. By older methods 600 pieces per day was the limit, now 2,000 can be worked on. The Advance Machine Works, Toledo, U.S.A., supplied a dovetailing machine, and the National Lock Company, Rockford, Ill., a machine for the making of lock and key holes. Other equipment on this floor includes a double tenoner, one band resaw for splitting lumber (by Cowan & Co., Galt), and a Smith triple sander, with an endless bed. This latter machine, which does perfect sanding in one operation, was made by the Canada Machine Corporation, Limited, Galt. Then there is a double cut off saw, two shapers, three band saws, and a spindle carver. Some very nice designs are made on this last named machine. At one end of the department is a repair shop and the filing room. The company chiefly use saws made by Henry Disston & Sons, Limited, Toronto.

When the work on the ground floor is completed, the parts are sent, by means of three elevators, to the cabinet department on the next flat. Here are belt and shaper sanders, and after this process, every piece is inspected for the purpose of seeing that the lumber is well sandpapered and sound. The tops, ends of dressers and drawer fronts are conveyed to the third floor to be printed, while the portions for the backs remain on the same floor. The printing finished, the parts are re-conveyed to the cabinet department and assembled by the workmen. When thus partly completed the goods are clamped in a machine in order to make them more solid.

The printing is done on a machine supplied by the Grand Rapids Panel Company, Mich. The wood first receives a ground coat of yellow paint, and then passes under a composition roller on which is impressed a quartered oak pattern. The roller is supplied with ink from a duct above, and makes an impression on the ground coat of yellow. This applies to flat pieces of wood only, similar patterns being printed on round pieces and the ends by hand.

From the assembling room the furniture goes to the department for staining and shellacing, and further sandpapering, after which it is varnished. The room used for this last process is exceedingly well lighted, and is shut off from the other parts of the building so as to ensure freedom from dust. The goods are dried in a temperature of 70 degrees. The room where the paints, varnishes, etc., are kept is fireproof.

As the furniture finally leaves the hands of the workmen, it is taken downstairs to some extensive warehouses on the ground floor, next to which are the shipping room and a storeroom for castors, hinges, a very big stock of glass, and other accessories necessary to complete the goods. The shipping room is advantageously situated for its purposes, as it opens right on to the Grand Trunk track, and furniture can be loaded directly into the cars. There is also a storeroom for such small parts as mirror frames, bureau backs, and sideboard backs, which are shipped separately from the cases.

The plant is run by steam, supplied by a 125 h.p. Wheelock engine by Goldie & McCulloch, Galt. For lighting purposes a 20 h.p. engine and a Canadian Fairbanks-Morse dynamo are installed. A Burnham pump (Darling Bros.) pumps the water through a heater before it enters the boilers, thus economizing fuel. The Waterous Engine Works Company, Limited, Brantford, are the makers of one of the boilers—150 h.p.—while the other of 90 h.p. came from Jenckes Machine Company, Sherbrooke, P.Q. The boilers are fed by shavings, which are collected from the machines by means of the Sheldons, Limited, Galt, exhaust system, and conveyed direct to the boilers. Any surplus goes to the shaving room to be burned later.

On the ground floor there is a small dry kiln for bending rims to be used in round extension tables. The superintendent's office is also on the same floor, and convenient to the machine department. The factory has just been equipped with Chapman double ball bearings.

It will be seen from the foregoing that the company have a well-equipped factory, capable of turning out goods economically, and that it is run on lines which make for a successful business.

Care of Band Saws in a Furniture Factory

By O. C. Oberberk.

SCROLL saws, ¼ inch in width, teeth spaced ¼ in. apart and twenty-one gauge in thickness, will give good results in average work, while for heavy work, such as sawing "swell" or "sweep" drawer fronts, a saw ¾ in. wide, 19 gauge thickness and ½ in. spacing will give good results. As the ¼ in. saws wear narrower, they may be used for sawing carvings, etc., while saws broken beyond repair may be cut in short lengths and used for jig saws.

In setting these saws I use an automatic set, after which the ¼ in. saws are filed on an automatic filing machine while the ¾ in. saws are filed by hand. Give just as little set as is required to make the bends and set oftener, as I think the saw chattering in cut, caused by too much set, tends to crystalize the saw, which in turn may cause the cracking of blade.

When filing a scroll band in an automatic filer which uses the regular 6 in. slim taper file, see that the edges of file are straight, that the machine is kept clean and well oiled and that there is no play in slide rods or bearings. I firmly believe that if the filing machine is kept in good order, it will give as good results as hand filing and more of it. Set the feed finger to bear on second tooth to be filed as this tends to keep teeth of a more even length. A few drops of lard oil put on the file once in a while will make it last longer and cut smoother.

In brazing the saws ¼ in. wide I use the blow torch method, filing the laps ¼ in. long and using silver solder as I think it gives a much stronger braze than spelter or brass wire. Clean the solder with a little pure muriatic acid, place it between laps, after which sprinkle with powdered borax and dampen with water. Start the torch, applying a slow flame at first after which bring it up to a good heat or until the solder flows freely; then clamp quickly with a pair of flat nose tongs. This tends to force all surplus solder out of the braze, making a strong joint. Care must be used in applying the tongs as the braze will kink easily while hot. This method of brazing with torch and tongs may leave the joint in a hardened condition, so take an oil stone or piece of emery cloth, brighten the saw and with the torch, draw the steel to a blue color, and it will be about the same temper as the rest of the saw. If care was used in filing the laps and if saw was placed straight in clamps, you will have a straight saw and a brake which will last as long as the rest of the saw. In dressing down the braze use a saw gauge to determine thickness. In brazing scroll saws ½ in. or wider, I use the regular brazing clamps which I use for the resaws, using silver solder and "Brazine" for a flux.

The proper size of resaw to use, as to spacing of teeth, gauge, etc., may be hard to determine when mixed woods are to be sawed. I would recommend the following spacings.

For a 20 gauge saw, teeth spaced 1⅜ in. apart 5-16 in. deep.

For a 19 gauge saw, teeth spaced 1½ in. apart ⅜ in. deep.

For a 18 gauge saw, teeth spaced 1⅝ in. apart ⅜ in. deep.

With hook line of 2½ in. in 6 in.; (see cut).

In leveling saw do not let swaged points rest on the leveling block as it will tend to show plate, slightly dished. Level the teeth as well as the rest of the plate and keep tense on as even as you can, using care to see there are no tight places near the edges. Run the tension from edge to edge, using no tire in saw. Put in just enough tension so that saw will lie flat on leveling block and put a little crown in back of saw, say from 1-64 to 1-32 in. in five feet.

In swaging a saw I swage out the points six gauges wider than the saw, then with the swage shaper, bring it back to 5 gauges of swage, in other words, a 20 gauge saw will have a finished width over top of tooth of 15 gauge, a 19 gauge will be 14 gauge, etc. Before swaging I put a "small amount" of lard oil on each tooth.

In brazing a resaw I make a lap of ⅜ in. for a 20 gauge saw, 7-16 in. lap for 19 and 18 gauge saws, taking care in filing to keep them free from oil, and never touching lap with the fingers, although Brazine will clean the laps of oil; still it is a good plan to keep the fingers off of some things.

Several years ago I tried to braze a broken piece of cast iron but it wouldn't stick and as I had trouble with my brazing irons sticking to the saw, I decided to have a pair of castiron ones made, now after using them for several years, I would use no other. Cast iron never scales in heating, does not stick to the braze and as they are planed to size, there is no poor braze, resulting from irons of uneven thickness. These irons are 1¼ in. wide, 9-16 in. thick by 18 in. long, surfaced two sides. Cast iron is brittle when hot and if you drop it on the floor it will break, but I have given them all the pressure that the brazing clamps were capable of and they would not crumble.

When the saw is placed in the clamps ready for brazing, heat irons to an orange color, slip quickly into clamp and apply pressure. When irons turn from dark red to black, remove them, pour machine oil over braze and you will have plenty of temper left in braze.

Dress up the braze the same thickness as the rest of the plate, put crown in back and tension the same as the rest of the saw.

In summing up this article I wish to say, if a saw has a poor place in it, such as a bad crack or a braze which is open in places, don't humor it; rather have it come apart in the filing room, than on the mill.

A File Holder and Protector

As a rule taper files for handsaws get worn out or useless as much from abuse or from contact with other tools in a box as they do from actual wear.

One of my crew had an idea we have adopted for keeping a file in good condition. Its a scheme that is simply perfect as well as perfectly simple.

Take a block the length of the file, say an inch strip, and bore a hole in it lengthways to fit the file tight; then saw a slit in one side down to the hole, this also being lengthways and you have a perfect jacket to hold the file when not in use and one that takes up but little room. It not only protects other tools but saves the file for its proper use.

An old broom handle is a capital thing for just such a purpose. I find it answers the purpose admirably.

In the earlier days of silos they were often painted outside and treated with tar inside, to preserve the wood. It was found, however, that the inside of the staves was quickly eaten by dry rot, leaving only a dry outside shell. The inner coating was not sufficient to keep the ensilage juices from getting through to the wood, but was very effective in preventing the wood from drying out again.

Operation of the Single Surfacer*

By William Adams

(Written specially for the Canadian Woodworker)

As soon as the surfacer has been started, see that there is little vibration. If the machine shakes badly, something is out of balance and you should find and remedy the trouble before trying to run the surfacer.

Set the knives very carefully. Some mechanics set them by means of a little brass gage. When this method is followed, the knives are each made to project a certain distance—about 1/8 inches—from the extreme edge of the chip-breaker lip. Many times this method of setting will give excellent results, but the writer does not like to trust that way alone, particularly with an unknown machine.

Every mill-man should have a couple of accurate steel straight edges each about three feet long, and, say 1½ in. wide by ½ in. thick. These should be accurately made in a good machine shop, and carefully kept in the mill for use when setting planer knives. Open the surfacer to receive the straight-edges, placed edgewise. Insert them, one at either end of the knives, then close the machine until the fed rolls and bed have taken their proper working position relative to the straight edges.

By doing as above noted, the truth of the entire surfacer-bed and feed is tested at the same time the knives are tried out. With the straightedges in position as above, turn the head slowly and carefully by hand and as the knife, or one of them, approaches the straightedges, watch closely to see if both ends of the knife are at the same distance from the straightedges. Note that distance, then turn the head until another knife approaches the straight edges. If the distances are the same for both ends of each knife, then they are accurately set. But if there be a difference, as usually is found, determine the distance the knife must be set out from each chip breaker lip, and make a setting gage for each lip, marking plainly, with center punch or cold-chisel, the particular side of the head to which each gage belongs. And then—always follow that setting for each knife, until the head shall be dressed again.

As for feeding of stock to the surfacer, there should be light enough to enable the planer man to feed the stock best side downward. With a single surfacer, if both sides are to be dressed, the face side should be dressed last, therefore, that side is to be run downward, the first time through the machine. Stock of uneven thickness, calls for a good deal of work by the knives, and should there be sides or ends of too great thickness, the head must be raised until it can carry the cut, the thick board run through, then the machine reset to standard thickness and the board run again.

"Bull-heads" are the worst pieces that a surfacer man has to contend with, and when dressing uneven lumber, unceasing vigilance is necessary to prevent accident from one of these wedge-shaped planks. It strains a surfacer head severely to run it into thick stock until the head stops dead and the operater always is watching out to prevent such a thing from happening.

It is better, where considerable uneven pieces are found, to throw them aside as found, until a number have accumulated, then raise the cutter head and run them all through, lowering the head and running them over again as may be necessary.

When running on round-edge stock, another peculiar trouble will beset the surfacer man, but as very little stock is shipped now-adays which is not square edge, this trouble does not often show up. But when it does come, it must be dealt with by an axe or an adze. I allude to a narrow strip of sap and bark left on the upper edge of boards where the log was a trifle too thick for the saw, and there was no top saw or they didn't have it going. This trouble is only met with in lumber cut in little local country mills, and never exists where band or gang mills are used.

But the sap edging can sure make it a whole lot interesting for the surfacer man. That strip of wood stands right up stiff, and it must be cut off with an axe or by means of an adze. But the surfacer man wants to beware of one thing and cut that thing out altogether, and that is—NEVER hew a board or plank after it gets into the surfacer! Hewing a plank thus ALWAYS leads to trouble sooner or later, and I have seen a number of good surfacers broken beyond repair through the habit of hewing a board which has been caught between the feed rolls. The trouble surely happens thus: Sometime or other—but surely sometime—the surfacer man lays the axe down on the board he has been hewing and starts the feed. The axe is run into the planer, the feed roll housings are perhaps broken, and the knives are spoiled, the head badly battered and the shaft sprung to the extent that sometimes a new head must be procured altogether.

Therefore—don't hew a plank in the surfacer. Catch those fellows before they reach the feed rolls, but if one should get in, raise the head, and pull the board out before hewing it. For, just as surely as you ever let an axe get on a surfacer bed—just so surely will you at some time, let the axe go into the surfacer. The only way to prevent this, is to keep axes off the surfacer bed altogether.

The great thing with single surfacers is to keep them at work. Every time there is a gap between two pieces of stock, that gap is just a certain percentage of loss of profits to the owner. Figure it out for yourself. While running 12-foot stock, should there be a foot of space between boards as fed to the surfacer, then there is 1-13th loss to the owner, or nearly 7½ per cent. of clear loss. Just realize what this means, if followed up. Many a mill owner would be on easy street, and your salary would be raised, if you could only jack up the profits 7 per cent. And here is one of the ways in which it may be done, by raising the output of each and every machine in the mill, and what is possible to one, may be possible to all, therefore look to it!

Having got the surfacer into good working condition, so that it turns out good work to its full capacity, the next thing is to keep it there. A surfacer will not work day after day and week after week, unless it is well taken care of and "kept up" so that it is always in first-class condition. In fact, a surfacer should be so taken care of, that it never needs overhauling and is just as good the last day it was run, as it was on the first day.

It is quite possible to keep surfacers in such con-

*Continued from August Issue.

dition, but it cannot be done by running them all day and letting them lie as you shut off power, until next day's run is commenced. A far different course must be followed. A surfacer which is to be "kept up" so as to be always as good as new, must never be allowed to stand over night with the day's run of dirt and dust upon it. Where is the turfman who would place a racehorse in the stall, or leave the horse on the track without care or attention, until the nag was wanted for another race?

I'm pretty sure that not many horsemen of that kind could be found in the Dominion—or out of it, but that is just the way they all leave the machinery of which so much is expected. A horse needs grooming, and so does a surfacer. Clean up the machine at night. Don't let the screws get filled with sawdust and dried grease so that it is impossible to lower the table, or raise the cutting head to full capacity without digging dirt out of the screws.

Don't let the screws wear a whole lot in one place and little along the rest of the screw. This is sure what will happen if the screws are not kept oiled as well as clean. The screws go dry, a lot of dust and grit gets into the thread and the constant movement of the screws between the 1 in. and the 3 in. limits, causes the screws to wear very fast between those points. Were the screws kept clean, and well dried, they would wear but very little more at the 1 in. set than at the 8 in. or 10 in. marks.

Don't let the babbitt get worn down so the bearings cannot be kept tight. Good surfacing cannot be done with loose journals. When the babbitt is renewed, place liners enough underneath the cape so that the bearings can be adjusted a number of times before rebabitting is necessary.

And, beyond all things, don't let the journals get sprung. A surfacer head-shaft will run 20 years without having to be turned or straightened if it is well taken care of and not sprung. But springing means a cut in the lathe and new babbitt, and two years off the useful life of the surfacer.

Trouble With Planer Screws

A 24 by 6-inch single surfacer planer which had been in use several years in a busy mill was sent to a machineshop for rebuilding. The planer had been a good tool and given excellent service for many years, but after it came back from the shop it never gave the satisfaction obtained from the machine previous to its rebuilding. The operator claimed that he was no longer able to get out stock of even thickness on both edges, that if he set the knives to plane equal thickness on ¾-inch stuff it would be "all off" on 3 and 4-inch stuff, etc.

The owners became tired of trouble with this planer, and it fell into my hands in exchange for other machinery, and I became the owner of that "Jonah planer," as it had been dubbed in the shop where it was used for so long, and the planer cost me in trade the munificent sum of ten dollars.

I had been studying the matter over pretty closely for a while and had formed a mighty good idea of where the trouble lay, so after setting up the planer in my shop I put through it a ½-inch board about 18 inches wide, and got ½-inch thickness on one side all right, but got nearly 31-32 inch on the other edge of the board. Then I put through a 2½-inch plank 20 inches wide, and got 2 15-32 inches on what was before the thick edge and 2 33-32 inches on what was before the thin edge. Here was trouble aplenty of all kinds, but this only deepened the conviction already formed as to the cause of the trouble.

The next move was to take out the screws which adjusted the thickness of stock. These screws were examined closely. Here was found the cause of the trouble, just as was expected. During the rebuilding of the planer one new raising screw had been put in, while one of the old screws was used on the other side. I found that a portion of the old screw was worn considerably at one end—where the thin stock adjustment was always made, while the other end of the screw was like new, as was the entire length of the new screw.

This caused a variable travel of one side of the planer bed when changing from thick to thin or from thin to thick stock, and this made the variable thicknesses complained of. Another new screw to take the place of the worn one cured the last vestige of trouble, and the planer is in use to-day and every day, and works fine.—Thomas Parker, in Wood Craft.

Some Sawyers and Resawing

Some resaw operations are so common in practice that one quickly notices any deviation from the regular practice and wonders if the way it is being done is correct and the new way wrong or whether it is just the other way about.

I looked in a mill a few days ago where the resaw was cutting inch stock into three pieces. It looked strange to me to see the board passed through and have one roll set at scant 5-16 and the tail man load the cut onto one truck and the thick piece on another to be taken back later and the outer roll set up and another 5-16 cut taken off mixed in on the truck with a lot of random widths, while the two pieces of the same board were kept together at the second cut.

This method of cutting was not so convenient for the cutoff man. He could have cut off the three pieces the board made as readily as he could cut two, all three pieces of the same board grading about alike.

Our way of sawing this sort of rough stock is what we call "thirding" and is done by setting both rolls to give and to one-third past the saw line, and having a chute from the tail man to the feeder, in which both pieces of the first cut are placed with the thin piece turned over so the two outside surfaces of the original inch board are together and it is thus passed back through the rolls, the saw cutting the thick piece into the other two-thirds without letting the board down on the delivery truck until it is sawed in three pieces.

The crosscut man then has all three pieces of the same board and grade, width and length, and gains 33 1-3 per cent. in cutting time. The ripper has the same advantage, as he can rip to grade on three pieces as readily as he can on two, when all three are alike.

To meet this requirement was what brought out the twin band resaw, with the two blades, one a right-hand saw and one a left-hand, cutting an even distance apart, but with the varying thickness of rough lumber, this left a variation in the boards that "thirding" on a single saw does not make, nor is it made on the twin thirding saw where one blade follows the other with guide rolls to hold the second saw to its place one-third of the thickness of the piece being sawed without any regard for the varying thickness.

Either of the two latter machines will almost double the output, but keeping the pieces together is the better method where there is only a single saw to do the cutting.—A. H. Haines.

The Fundamental Properties of Wood Stains

By Charles Harrison

I CONCEIVE the following to be essential properties inherent to a good stain, and I give place to the following:

Firstly, the material must be in a state of solution, i.e., free from suspended or partially suspended matter.

Secondly, the stain should contain little or no colloidal substance, more particularly of the character of glue, size, gum, starch, etc.

Thirdly, the stain may or may not undergo any change after application, but if a change be intended, it should take place at the time or immediately after being applied, but such change must be final.

Salts Known to the Polisher

Now, by way of illustration of the three conditions advanced by me, I make mention of perhaps one of the most familiar chemical salts known to the French polisher, that is, bichromate of potash, or, correctly speaking, in the language of the chemist, potassium dichromate, a specimen of which is before you. The salt dissolves in water, hence forms a solution; such solution, when properly prepared, is free from suspended matter. Again the solution is practically free of colloids. It is therefore easily seen that the first and second proposition which I have advanced have been fairly complied with. I now turn to the third. It will be generally agreed that when the stain in question is applied to mahogany of a kind well known to the trade, a change occurs, the mahogany becoming deeper in tone.

Now the precise action of the stain upon this particular wood is somewhat obscure, but from ideas derived through observation on my part, there are strong grounds for the assumption that it is not entirely the stain which creates the change of tone, but, rather, in turn, such change is dependent upon the amount of effort the wood itself can exert upon the bichromate salt. A sort of what the chemist would call mutual decomposition takes place. This statement, if not entirely, is certainly partially, borne out by an experiment which I will execute for your observation. It is well known to chemists that if a solution of potassium dichromate be treated with organic matter, reduction of the salt in question takes place with a corresponding amount of oxidation of such organic matter. I therefore take a solution of bichromate, add a little cream of tartar, or if that were not to hand, I would take some starch or gum, etc. On warming somewhat a change to a sort of olive-green color is easily seen, due to the decomposition of the chrome salt, likewise the cream of tartar. I have performed this experiment, not with the object of trying to prove the chemist right or wrong, but rather to better impress my audience with the admissibility of the idea of a mutual decomposition, also with the fact that when reduction takes place, oxidation also results. Let me next point out, before we dismiss the subject, that the magnitude of reduction and oxidation are dependent, as it were, on the power or fighting strength of the dual forces.

Returning to my third proposition, from which I may appear to have disgressed. From the statement I have just made, I am confident it will be quite an easy matter for every one to grasp the full significance of its nature, also at the same time to sum up the character of the bichromate, thus ascertaining in what manner, if any, it is wanting in order to fulfill the quoted specification. We now find that the stain undergoes a change on or immediately after application, and that such change is intentional. But is this change absolute or final? This, I feel convinced, is not the case, and my reasoning for such a statement is based on the well-known property possessed by bichromate of acting as a bleach or oxidizing agent. Thus, bichromate, which so readily imparts tone or color to mahogany, eventually is reduced to a kind of ashy-gray color, especially on outside work, particularly in situations with a south aspect. All that is necessary to establish such result is to allow the polish to become perished with unconverted bichromate present, such, in conjunction with the elements, finally produces a color that but few polishers will stop to admire.

While on the subject of fading, I am reminded of the fact that there is a section of the trade who are clamoring for an easy and simple method for converting new mahogany into a kind of faded-out appearance. I think from what I have just stated, a means of obtaining this end would be found by simply treating the work with the stain, afterward submitting it to ordinary atmospheric conditions. Work oiled over after staining would not seriously interfere with bleaching action; anyway, that is my opinion. Hitherto I have not been so far interested as to submit wood to a test of this kind. Possibly some may have done so. If this method has not been tried, then it still remains for some one to give it a trial.

Science in Popular Language

At the risk of appearing superfluous I may venture to give a more extended account of the nature of bichromate, for it is my intention to introduce to your notice other kinds to that which is generally used by the furnishing trade, confining myself as far as I know how, to simple phraselogy, since it is more than likely that this paper may be published in such trade journals not usually devoted to topics of chemical technology or applied chemistry. I have, therefore, not only the interest of my audience, but the intelligent general reader to bear in mind. Bichromate of potash, it will be seen, is a compound of two metals, potassium and chromium, in the proportion of one equivalent of potassium to two equivalents of chromic acid; this salt is therefore inorganic. It should be understood that a chemical salt is a union of a base and an acid radicle. That which chemists call a base may be likened to that substance which, when dissolved, say, in water, its solution is found to impart a sort of soapy taste, such as is represented by potash in bichromate. While, on the other hand, the acid may resemble that which imparts a sour or vinegary taste, represented in this instance by chromic acid. Generally there are three types of salts termed by chemists neutral or normal, basic and acid. Normal may be represented to consist of equal equivalents of base and acid, basic two equivalents of base and one of acid, acid salts one equivalent of base to two of acid. It will now be seen that bichromate belongs to this latter class of salts. From these remarks one can now more easily appreciate the chemists' term previously quoted, "potassium dichromate." The salt crystallizes in large red transparent anhydrous four-sided tables. It is soluble in the pro-

portion of about one part to twelve parts of water at a temperature of 60 degrees Fahrenheit, the color of the salt being due to the presence of the acid forming oxide of chromium.

Here let me state that chromic acid not only combines with potassium to form bichromate, but such other bases as sodium, ammonium, etc., giving rise to such analogous salts as sodium and ammonium dichromate. These salts, however, do not appear to be particularly well known to the French polisher. For example, I have been connected with the trade for nearly thirty years, and have never even heard a polisher mention them; neither, of course, have they been called for. For the purpose of showing you whether such are utilizable, and with what results, I have coated five kinds of mahogany, notably, Cuban, Honduras, American, African and Spanish; as you see, each board shows three patches of stain, one produced by potash dichromate, the other two being sodium and ammonium dichromate respectively. These I pass round. You will, of course, notice the difference of shade produced in each instance. The stain of that from the ammonium salt is particularly striking for the depth of color produced. The color obtained from the sodium salt is also characteristic, but whatever its character may be, there are strong grounds for not adopting it too readily, since this salt is particularly deliquescent. I have these salts upon the table for your inspection. The sodium salts has been purposely placed in this basin previously to the meeting, and although fairly dry when placed there, it now contains some liquid material. This liability to liquefaction leads me to caution you not to adopt it without due trial, since it is, in my opinion, very likely to destroy the superimposed shellac coating. I want to return to the ammonium salt for a moment, in order to show you a rather striking, perhaps an amusing experiment. On causing a little of the sale contained in this iron dish to be slightly heated, it is seen that the red salt is readily decomposed, with evolution of heat, to a dark green powder—green oxide of chromium. One is now enabled to sum up truly in a limited fashion a few important individual characteristics existing between these chromic salts. Potassium dichromate is a fairly stable one, since it is neither deliquescent, nor is it decomposed by moderate heating. If there be any one who has paid attention to what I have stated, he will be in a position to distinguish for himself between either of these three salts if ever there be a need to do so.

I feel it will be of some interest to give a few remarks about chromic acid. This acid comes about by the oxidation of the metal chromium; such being the case, two oxides have been clearly brought to your notice, notably the green oxide just produced, and now this sample of red acid crystals which I hold before you. Here one may become a little perplexed as to why both should be oxides. Allow me to direct your attention, as it were, both ways—left and right. Let me say, on my left is the green oxide powder, on the right crystalline oxide, which is acid. Let me repeat both are oxides. The green is produced by reduction of the red, and the red can be produced by oxidation of the green. Green, then, is the lower oxide. Now a sharp imaginary line may be drawn between each, since the green may act as a base to strong acids, such as sulphuric acid, etc.—such combinations giving rise to chrome alum—producing a series of salts whose solutions show a green color. On the other hand, the higher or red oxide forms an acid to a strong base, e.g., potash. It will now be understood that the red color present in bichromate is due to this particular oxide of chromium. I would not have troubled you with these remarks but for the fact that in the action of staining with bichromate, the rich color produced is no doubt due to a partial reduction of the chromic acid to some compound lying between the red and the green, or it may be a mixture of both, i.e., red and green.

Looking in another direction, the green quoted is, or may prove to be, a very important factor to the trade, and by the trade I mean those who are so extremely busy creating copies of the old masters—forgeries is a description I have heard for them. Now it may not be generally known that the existence of chromium was not discovered until the year quoted, work made previous to that period could not have been stained with bichromate. There is also a great probability that this stain was not applied until some years after its discovery, but when, I am unable to state. Possibly someone of an older school present here could give a little information upon this point. Now comes the turn of the antiques. I am no authority; but if Sheraton, Adam and Chippendale periods existed prior to the year 1797, then it is safe to state that fraudulent goods will be rendered easy to detection when they have been stained with bichromate. The detection to me, at any rate, seems quite simple. Scrape the surface down to wood, collect, all scrapings, incinerate, cleanse the resulting ash, and the residue will be green chromium oxide. It will be remembered at the outset that I indicated indifference to the science underlying the polisher's art. It will be a sorry plight for manufacturers or dealers of antiques, which are supposed to be of a period previous to 1797, if they eventually reveal presence of chromium, for are there not the chances of a judge settling the price to be paid for their indifference in the past in regard to the staining operation of goods of the nature described?

Concerning Cracks in Bands

By E. L. Mason

Some time since the saws on the log side commenced to crack on the tooth edge, from ½-in. to 1-in. deep. Just previous to this we had been sawing some very hard maple logs, and I had rolled the tension pretty close to the edge, so naturally I thought, when the saws began to crack, that I had too much tension in them; but after looking them over twice, I came to the conclusion that it was something besides tension that was cracking them.

I lined up the mill, and, in looking it over, found the bolts that take up the side play of the boxes both loose. These I tightened up, found the mill in line and the saws have since run with few cracks. Now, these locknuts were screwed up with a 20-in. wrench not more than two weeks before they were found loose, and it has been something of a question how they came to get loose. They never did before that, and never have since.

Usually, when the sawyers have an accident with a saw, they either tell me or mark on it with a piece of chalk, "Slivered." I put that saw on the bench ahead of another that I think is getting run down. But recently one of the sawyers forgot to do this, and a saw that had been badly pulled out on the back edge was sharpened and run again, result, eighteen cracks on tooth edge when it came off.

For more than a year we run an offset that worked

the wrong way as often as the right way, and was just as apt to offset in the middle of a cut as anywhere else. This, with all parties concerned fully aware of conditions. During this time many saws were crippled, then run long enough after to get several cracks. This was the cause of ruining many saws.

Again, a saw ran through a few small nails and lost some corners on the log side. The sawyer, thinking to finish that log without changing saws, turned the log, and in taking a cut off for the resaw, struck a ¾-in. bolt that was in the log, out of sight. This caused the saw to run out of the cut before the carriage could be stopped, causing one large crack in the back and two in the tooth edge. These are all causes for cracks getting in saws outside of the filing room.

I was in a double band mill, as a visitor, when I saw an accident that was different from anything I ever saw before or since, although I have seen something similar happen with light circular mills; but this mill was a large 8-ft. mill, using 12-in. saws. The right-hand mill was sawing a basswood log 16-in. diameter, with a crotch on one end about 4-ft. long. When the saw struck this crotch, it shut up on the saw so tightly that it stopped the mill dead, and the saw had to be chopped out with an axe. I have seen many band saws chopped out of logs, but never one that stopped a heavy mill short or that was fast in a basswood log. In fact, this was the only basswood log I ever saw spring to amount to anything. When the saw was taken off it did not have a crack in it, although I never heard how it came out later.

Away back when I was in the circular business I was sawing a big maple and got a little too much feed. The saw stopped, the dogs pulled out, and the log rolled against the saw heavily enough to bend it so it needed hammering.—The Wood-Worker.

Graining in Imitation of Mahogany

An Outline of English Practice

WHAT follows descriptive of the method of graining a door in imitation of mahogany represents English practice and is taken from a late issue of one of our London contemporaries.

In the first place, the ground color can be prepared by mixing equal parts of yellow ochre and orange chrome yellow, and adding one-fourth part of bright venetian red. To get the brighter color, the yellow ochre may be omitted and half the quantity of white base substituted. The color should be thinned with one part raw linseed oil to three parts of turpentine and sufficient liquid driers to dry the color in from 12 to 15 hours. When the door has been thoroughly sandpapered and dusted, the first coat of color is applied. After an interval of at least three or four days the second coat is applied, and when thoroughly dry the graining is done. This portion of the work may be done wholly in water color, or by being done partially in water color, and it may be finished in oil color.

The graining colors are burnt sienna, vandyke brown and rose lake or rose pink. For a very bright shade, crimson lake may be used in the overgraining color.

Vandyke brown alone, ground in water, is used for the water color stippling, when the work is to be finished in oil color. The vehicle for applying the color is one part stale beer or vinegar to two parts clean water. The color is applied in a thin wash and while wet, is stippled or flogged with the long bristle made for that purpose. The object desired is to endeavor to produce the effect of the dark pores of the wood.

When dry the oil color is applied over the stippling. The color is made by mixing equal parts of burnt sienna, vandyke brown and rose pink. Thin this color with a mixture composed of one part raw linseed oil to two parts turpentine, adding a sufficient quantity of driers. Make the color thin and apply with a soft brush evenly over the stippled work. When slightly set, take some of the graning color and thicken it with some of the rose pink and vandyke brown, and with a small fitch tool make the dark veins in the wood. Draw the dry rubbing-in brush first lengthwise with the grains and when the color is levelled or smoothed, blend lightly crosswise, but always in one direction. This will produce an effect similar to that seen in the natural wood. A badger blender may be used instead of the rubbing-in brush. One edge of the darker veins is invariably darker than the other and seems to recede into the wood.

Study the grains of the wood and notice all the lights and shades and endeavor to reproduce their counterparts in the work. When dry, the oil color may be overgrained in oil, using a thin wash of the graining color. Or the crimson lake may be used alone, reduced to a very thin wash with the thinners previously mentioned, or with a mixture of liquid drier one part to two parts turpentine. When thoroughly dry, this may be varnished.

Where the work is done wholly in water colors, the graining color is composed of the same proportions of pigments, and they may be mixed together or used separately and a dip of each applied and blended on the work. The latter method is most frequently pursued by trade grainers if the work is not of very large size.

The work is first damped over with a sponge wrung out of some stale beer or vinegar. The color is then applied sparingly and worked up with the mottler, sponge and blender to produce the effect of light and shade in the wood. This process cannot be described with accuracy. Nothing but a study of the real wood and a careful attempt to reproduce similar effects can afford an idea of how it is done. The darker, finer grains (which usually run in the general direction of the heart grains of the wood) are represented by using a thin overgrainer charged with dark color and applied over the dry water color, and blended at once to produce a sharp, clean edge on one side of the work. When this is dry, it may again be overgrained, using thinner color, and when all is dry the hand can be passed lightly over the color to remove any surplus dry color and the final overgraining may be done in oil color as previously described. A very thin wash is all that is necessary for this overgraining, as the thicker color obscures the sharpness of the work done in water color.

When dry, the work can be varnished or it may be finished in oil, using two parts raw linseed oil to one part turpentine, adding sufficient liquid drier.—The Furniture Manufacturer & Artisan.

Properties of Oriental Lacquers

Chinese and Japanese Lacquers—Real Lacquers Hard to Handle and Dangerous—Good Results by Imitations Made With Varnish

LACQUERED objects from the East have always been held in great admiration by the European because of the durability and beauty of the finish on such articles, writes Henry A. Gardner, Assistant Director, the Institute of Industry, Washington, D.C., in the Furniture Manufacturer and Artisan. Although the nature of the lacquer used to produce such results has been considered by some as a native secret, such is not the case, for there is available much information regarding this material.

One of the first genuine samples of Chinese lacquer brought to the United States was that received by Dr. D. W. Fairchild, plant explorer of the Department of Agriculture at Washington, who called in the writer upon the arrival of the material. As the poisonous nature of the lacquer was known, great care was exercised in removing the wrapping paper frm the carton containing the product. A very small portion of the lacquer which had leaked from the carton was probably responsible for susequent developments of a rather serious nature. A few hours later Dr. Fairchild, two assistants and the writer were all suffering from a rather severe attack of poisoning, an eruption similar to that produced when the epidermis comes in contact with poison ivy, being quite visible upon the hands and face. In one case the poisoning caused great swelling of the face and even extended to the eyes of the observer. Lead acetate, bromine dissolved in olive oil, and potassium permanganate were used as remedies, the writer finding almost immediate relief to result from the application of a wash made of carbonate and oxide of zinc suspended in lime water containing a small percentage of carbolic acid, menthol and glycerin.

In examining the lacquer, great precaution was observed to prevent further ill effects. Nevertheless, the writer and his assistant, L. G. Carmick, were again attacked with the same results.

The lacquer was semi-transparent and resembled boiled linseed oil in color. Its viscosity was about the same as that of glycerin. In the bottom of the receptacle containing the sample, was observed a considerable quantity of what appeared to be a white pigmentary substance such as white lead, which had settled out. It was found, however, that this material was simply a constituent of the laquer and contained no inorganic material of a solid nature. Both the upper layer, which was clear, and the lower layer, which was opalescent, were found to be almost wholly soluble in alcohol, about five per cent. of the resinous matter being insoluble at ordinary temperature. Considerable moisture was present in both samples, but to a greater extent in the milky portion. The addition of barium hydroxide to the alcoholic solution of the lacquer precipitated a heavy, green, curdy mass over which appeared a light colored supernatant liquid. When the raw lacquer was spread upon glass plates, it turned brown in a very short time, and within twenty-four hours had become hardened to a tough film, black in color. The application of two or three coats of the raw lacquer to a wood surface produced a smooth, dark finish which apparently was quite elastic. This finish was tested in comparison with a finish produced with a high grade varnish made from copal resin, China wood oil, linseed oil and turpentine. The latter was found to be superior in its hardness and resistance to moisture.

Although an elaborate series of experiments had been contemplated, it was necessary to discontinue the investigation at this point, on account of the accidental destruction of the bottle containing the lacquer. For the benefit of those who might care to continue similar experiments upon Japanese lacquer, the writer would suggest the use of long rubber gloves upon the hands. Protection of the face may be had through the use of vaseline. Application of alcohol of moderate strength will dissolve any of the toxic substance which may have come in contact with the skin.

Rhus Lacquer

Considerable matter of interest has been published on the subject of rhus lacquer during recent years. From the reference cited below, the following information has been summarized:

Rhus lacquer is obtained from the lacquer tree which grows in China, Japan and India, flowing as a thick, milky emulsion from incisions made in the trees by the natives. The tree, which resembles an ash in appearance, sometimes reaching a height of sixteen feet, is ready for tapping at the end of seven years' growth, the greatest yield of lacquer being given when the tree attains the age of eighteen years. After the lacquer is collected, in much the same manner that turpentine is collected from the pine trees, the moisture is removed by exposure to the sun or by the application of gentle heat. Several filtrations follow, in order to remove suspended matter, etc.

Another grade of lacquer, which is of lower quality, is made by maceration of the branches of the tree. This second grade is not used for the finer types of work and is often found adulterated with wood sap or with raw wood oil. In the latter condition it is said to be used as a general preservative for exterior surfaces of wood or metal.

In gathering the lacquer from the tree, the workman generally protects his face with a cloth, but even this precaution is insufficient in the case of the European, who is apt to be affected by the poisonous principle of the lacquer when passing through groves of the trees. It has been held by some investigators that the toxic principle is volatile. Tschirch has contradicted this assertion and claims that the toxic substance is present as an oily material, a minute particle being sufficient to cause great irritation, the action being similar to that of the toxic principle of rhus toxicodendron (poison ivy). It is generally known, however, that the dried lacquer is not poisonous and that lacquered objects which have become dry do not exert any untoward effects.

The greatest develpment in the manufacture of lacquer and the highest skill in the art of lacquering is said to have been reached in the city of Foochow, but the Chinese or Japanese lacquer industry is not an important one as compared to the lacquer or varnish industry of the United States, the value of the raw product in China being less than half a million dollars an-

nually. The average price for the high grade product is in the neighborhood of 40 cents a pound.

Although the artisans and workmen in rhus lacquer produce many beautiful art objects, the widest application of this material is said to be in the finishing of coffins for the wealthy, as high as $2,000 being paid for a coffin properly lacquered. The high cost of this work is accounted for by the fact that long periods of time are required for the finishing of the work, the careful application of numberless coats being interspersed with long periods of drying and hardening. This procedure probably accounts for the durability and beauty of the finish.

A Satisfactory Process

One lacquer process which has been cited as satisfactory for ordinary work is to prepare the wooden surface to a smooth condition, all cracks being filled with a composition of oakum and lacquer. After this there is applied a priming coat made of a mixture of lacquer and emery powder. This is rubbed down and re-surfaced. Then follows the application of six or eight coats of lacquer, each coat being pumiced and polished with the greatest care. The work is, as a rule, carried out in damp and dark rooms, the exclusion of direct light and the presence of moisture being necessary for the production of the best results.

For colored lacquers, pigments such as barytes, Chinese vermilion, iron oxide, Prussian blue, orpiment, cadmium sulphide, chrome yellow, chromium oxide, lampblack (gall nuts and iron sulphate), have all been used in admixture with the lacquer. Of late years, the organic color lakes have been substituted, to some extent, for the inorganic color pigments. The colors given above are also used together with lacquer in the manufacture of what is known as "carved" lacquer, a thick mixture or paste made of lacquer and pigment, sometimes admixed with a little wood oil, acting as the base which is applied to wooden surface and built up into a thick mass subject to carving.

The darkening of the lacquer, which is shown upon drying, is not due to the action of the light, according to Weisner, who has tried the drying of the lacquer under glass receptacles containing colored solutions designed to keep out part of the spectrum. Majima attributes this darkening to the action of oxydases and laccases upon the resin constituents of the lacquer.

The adulteration of lacquer with wood oil or sap may be detected by the analytical procedure outlined by Miyama, wherein barium hydroxide of one-fourth normal strength is used to titrate the alcoholic solution of lacquer; one gram of the lacquer principle (urishiol) requiring 6.14 c.c. of N/4 barium hydroxide for its precipitation. In this volumetric procedure, phenolphthalein is used as the indicator. The average analysis of high grade rhus lacquer will show the following constituents:

Lac (urishiol)	85 per cent.
Water	10 per cent.
Gum Arabic, etc.	3 per cent.
Nitrogenous matter containing diastase	2 per cent.

The studies of Miyama and Majima have thrown much light upon the composition and properties of rhus lacquer. The drying of the lac has been shown to be due to the action of a diastase present in an albuminous substance. This diastase is coagulated and rendered inactive when the lacquer is heated. The formation of oxyurishic acid has been claimed by some investigators when the lacquer dries. Bertrand concludes that the drying of the lacquer is partially due to oxidation, but that a combination of diastatic and oxidizing action is necessary for the production of the hard drying, insoluble product. Miyama claims that the principal constituent in the lacquer is an aromatic compound containing carbon, hydrogen and oxygen, the latter existing in the state of hydroxyl, and that the lacquer shows a phenolic character, containing at least two phenolic hydroxyl groups. Majima obtained by catalytic reduction of urishiol with hydrogen and platinum black, crystals of hydrourishiol. His conclusion is that urishiol has the constitution of a dihydroxybenzene with a large unsaturated side chain.

It is well known that objects, properly coated with rhus lacquer, are beautiful in appearance and that they preserve their appearance and durability for years, even under trying circumstances. Cases have been cited where rhus-lacquered objects have been removed from shipwrecked vessels after many years of exposure to salt water, and found to be in an excellent state of preservation. It is the writer's opinion, however, that this is due almost entirely to the great care with which numberless coats of lacquer are applied to such objects. Such a procedure would be uneconomical in this country. Moreover, on account of the poisonous nature of the lacquer, it could not be worked with success by our own artisans.

In the writer's opinion, the application to properly prepared surfaces of a very few coats of the higher grade varnishes made in the United States is productive of results that cannot be equalled through the application of the same number of coats of rhus lacquer.

Troubles Encountered With Sectional-Roll Planers

SECTIONAL-ROLL planers are good things which help produce more work, especially in the dressing of narrow stock, but like many other good things, they are not without certain troubles. It is well to know about these so that precaution may be taken to prevent them if possible. The other day I happened on to a man just after he had had trouble with a machine of this kind. It was a wide cabinet planer made up of narrow, sectional units, each unit being two inches. The feed rolls were made up of two-inch sections, and naturally called for the chip breaker to be made up of sections of the same size. It is right here that trouble develops occasionally. A hard knot, or something, will now and then strain one of those sections of the chip breaker and pull it into the cutter head. When this happens, a lot of other things happen immediately. The catching of one chip breaker in the cutter head usually means that the cutter head will jerk out the entire chip breaker, wreck the hood of the machine, ruin a set of planer knives, and do injury to the operator. It will be a lucky accident if the cutter head itself is not sprung or damaged. Perhaps the easiest way to guard against frequent accidents of this kind is not to have so many sections in the feed roll and chip breaker. Three or four sections on a 24-inch machine should serve practically all purposes, and it would give more rigidity of parts in the pressure bars so that there will be less danger of accidents of this kind. If, however, it is found necessary to use a greater number of smaller sections, the machine should be gone over from time to time and the chip breaker sections carefully examined and tested to see that they are not straining in and getting in danger of being caught by the knives on the cutter head.

C.P.R. Planing Mill at Ogden, Alta.

Interesting Details of Design and Equipment—Layout Planned to Facilitate Operations and Ensure Maximum Capacity

IN the May number of the Canadian Woodworker we gave some particulars concerning the new C. P. R. planing mill at Ogden, Alta. Since then additional facts have come to hand which enable us to present a second article on what may be considered one of the most interesting plants of its kind in Canada.

The mill is located between the coach shop and the freight car shop operated by the C. P. R., and is a building 303 feet by 80 feet, fitted with the most up-to-date woodworking machinery used in car repair and general work. All machines are fitted with vacuum exhaust tubes for carrying away shavings, etc., the fan for which is driven by a 100 h.p. motor which delivers the shavings to a boiler in the power house, which is specially designed for burning them. The layout of machines is arranged so that material will not have to be handled more than is absolutely necessary. Rough material enters at the east end and leaves finished at the west end, which being closest to the freight car shop saves a lot of unnecessary labor. The shop is traversed, as will be seen by the plan, by two sets of 20-inch gauge industrial tracks, comprising a standard gauge track. A turn-table is placed in the centre so that lumber can also be brought by side doors, if so desired. These tracks are supplied with suitable trucks which can be run alongside most of the machines, saving a lot of delay and unnecessary handling of material.

The machines are mostly individual motor driven, except a few small ones which are group driven. Most of the machines are of American make and were supplied by the J. A. Fay & Egan Company, Cincinnati, Ohio, some were also supplied by the Cowan, Limited, of Galt, Ont., the Berlin Machine Works, Limited, Hamilton, Ont., and the Canadian Machinery Corporation, Limited, Galt, Ont.

The motors were supplied by the Canadian General Electric and Canadian Westinghouse Companies.

The accompanying illustrations show the positions of the various machines and their maker's names. It will also be seen by the plans that the lumber storage is well equipped with tracks and that cars of lumber can be run into the mill to load and unload lumber if so desired, and every convenience is provided for the handling of material at the minimum cost.

The shop is heated with hot air, driven by Sturtevant fan, distributing the heat to various positions in galvanized pipes. A high-pressure air line is placed conveniently so that connections can be made close to machines for cleaning them by air pressure, as well as affording a source of power to carry out any repairs that may be necessary. The southwest corner of the shop is provided with benches where the carpenters can work. The central portion is equipped with an overhead monorail to remove any large pieces of lumber when necessary. These are fitted with Pilling air hoists and are remarkably handy.

The switch and fuse boxes are placed in convenient places, and well protected from dust, etc., at the same time being accessible by the operator.

As most of the lumber comes direct from British Columbia points, it has to be dried before using, and a large dry kiln is used capable of drying 100,000 feet of

Interior of planing mill, C.P.R. shops, Ogden, Alta.

lumber. The kiln is ventilated and heated in the most modern style.

The artificial lighting system of the plant is composed of numerous 100 candle-power incandescent lamps, plug boxes are placed in handy positions so that extensions can be taken from them.

The floor of this shop is laid in mastic, which makes it very warm and comfortable in winter, as well as affording an easy footing.

Ambulance and first aid cabinets and a stretcher are placed in a central position and competent first aid men are in charge of them.

The foreman's office is 18 feet by 20 feet and placed near the centre of the shop where a good view of shops can be obtained.

The shop is well equipped with wash lavatories and closets, and men are provided with steel lockers for their clothes, etc. The windows are all adjustable and thorough ventilation is assured. The shop is fitted with automatic hydraulic fire alarm system working in conjunction with sprinklers, which, with plant fire brigade and watchmen's clocks as distributed about the mill and lumber yard render fire almost an impossibility. Throughout the shop all machines are carefully fenced so that all dangerous gearing is protected.

Taking this shop on the whole, nothing has been left to prevent the greatest output at a minimum cost, and after several months' operation it has been found that the machines are giving the greatest satisfaction.

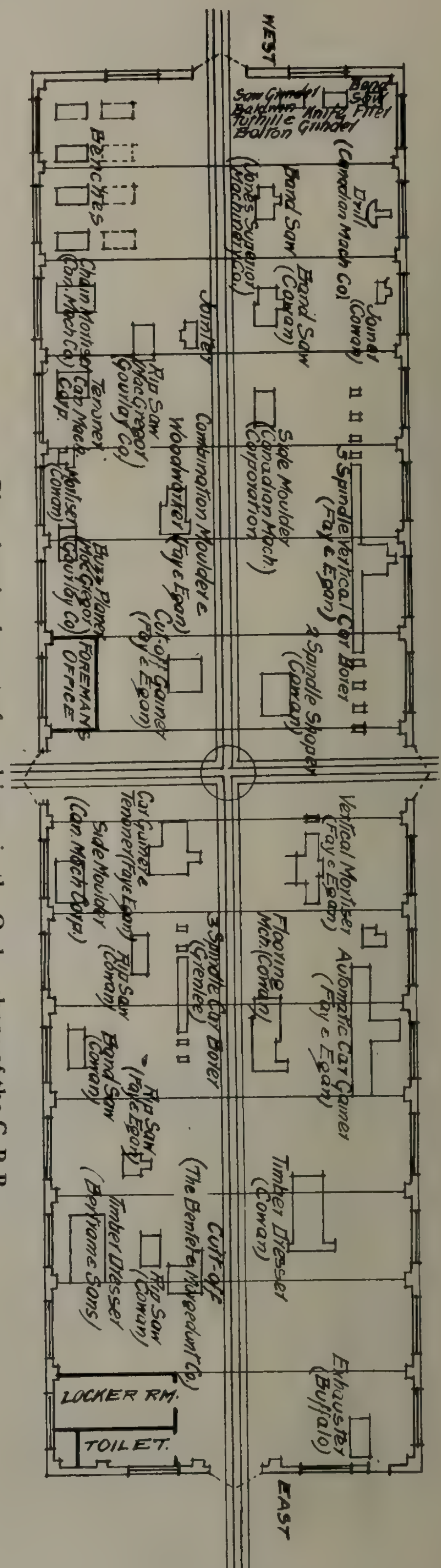
Safeguarding the Band Saw

By J. Crow Taylor

I am carrying a game finger on my left hand, the only mark of about fifteen years of service along with woodworking machinery, and this game finger is a reminder of the danger point on a band saw, for there is where it happened. It is the back part, where the saw blade goes up. A careless reaching around for stock that had been shoved back on the machine took my hand in contact with the up-going side of the saw one day. This put me on the hospital list for a couple of weeks and I will carry one game finger the balance of my days. A few days ago this story was told to a band saw operator in a planing mill, and he looked up smiling and said that is the same place where he always gets it. Then he pointed to the back of his machine where the usual strip going up and back of the saw had been re-enforced by another one covering the front so that he can't accidently stick his left hand back into it.

The bottom wheel of the saw should be surrounded with a housing, and it is better to have the top wheel housed in, too. But don't forget the back side of the saw, it is there more than the front that there is a danger point to safeguard, and there have likely been more fingers cut on the back than at the front where the work is done. You are looking at the front, and are not so careless about it; so protect the left hand by shielding the back side of your saw.

A man's value to his employer is not in his large bones and muscles, his weight-lifting and strenuous physical labor. Human muscle power is the most expensive form of energy used. A man is valuable in proportion to the thought, the physical inspiration, and the happiness he puts into his work. A man doing work he does not love lacks enthusiasm, interest, and concentration, therefore, is not efficient.



Plan showing layout of machinery in the Ogden shops of the C. P. R.

American Woodworking Machinery Company's Plant at Rochester.

Big Rochester Firm Opens Branch in Toronto

THE American Woodworking Machinery Company of Rochester, N.Y., recently opened an office at 152 Bay street, Toronto, and have appointed Mr. William Garlock, Jr., as their Canadian representative. Mr. Garlock has been eight years with this company, first in New York City, then in Chicago and afterwards in Rochester, leaving there to come to Toronto to take entire charge of their Canadian business. The American Woodworking Machinery Company's head office and factory is at Rochester, N.Y., their plant there being 576 feet long and having approximately 119,000 feet of floor space

Interior View American Woodworking Machinery Company's Plant.

without any partitions in it. This plant covers an area of 10 acres. The two views of their plant shown herewith give an idea of how this company is equipped for turning out first-class machinery. They also have two factories at Williamsport, Pa.; and others at Montgomery, Pa.; Aurora, Ill.; and Green Bay, Wis. The company was formed in 1898 with headquarters in New York City, but in 1906 they moved to their present quarters at Rochester.

The American Woodworking Machinery Company manufacture a full line of machinery for planing mills, furniture and box factories, cabinet and pattern shops, sash, door and blind factories. Some of their well-known brands are:—"American" Moulders, "77" Planer and Matcher, "Columbia" Sander and Cabinet Surfacers.

The opening of the office at Toronto is the first occasion on which the company have had a permanent representative in Canada.

One of their catalogues can be had for the asking.

The Orderly Small Planing Mill

By T. C. James

ORDER and system are just as important, and often easier to get, in the small planing mill than the large one. There are fewer complications involved, thus the system can be shortened and the manager keep in closer touch. An excellent type of the smaller mill is illustrated herewith, says the Wood-Worker, Indianapolis. The company didn't want to operate a planing mill, but, like many other retail lumbermen, found it must have a few machines and benches to take care of special work. It erected a one-storey building, about 40 or 45 ft. wide, 120 ft. long with a concrete floor, and arranged the machines as shown in the accompanying sketch, so that the rough stock starts in at the end next the stock shed, makes a complete circuit of the building in regular order, and comes out where it started, and where it is also handy to either load directly on the wagon or put into the stock shed until needed.

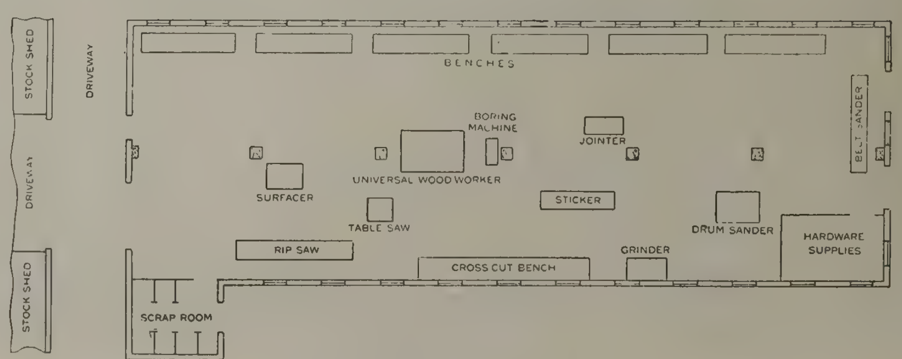
The floor plan of this mill, given herewith, is not made to exact measurements, but is a rough sketch of the relative positions of the machines. So many of them may be "out" a little, but they serve to show the scheme and the number and kind of machines. Beginning at the driveway entrance, there are grouped the rip saw, the surfacer and the cross-cut bench, which has a swing saw over it; then comes a table saw, universal wood-worker, with about six or more machines combined in one, including jointer, shaper, band saw, mortiser, etc. Farther alone is a post-boring machine, the sticker, a top smoother and jointer, a drum sander, a belt sander and a grinder, while coming back on the return side of the mill is a row of six work benches and plenty of elbow room for handling stock and putting it together.

Up at one corner, inside the mill proper, will be noticed a little stock room, in which are kept nails, properly racked in box bins, hardware, paints, oils, etc., while down by the ripsaw, outside, is a scrap stock room with a series of stalls, in which the scrap from cuttings is kept in an orderly manner, so that any part of it can be gotten at handily. The result of this arrangement is that after a year of work there is not much more scrap left in there than would ordinarily be found at the end of a week's run. It is kept worked out, so that the scrap pile is a live asset and not a dead junk pile.

A bigger thing than the mill itself in point of territory covered is the stock shed, which, together with the mill building, forms a sort of "T," with the top longer than the stem, and a space between where the stem should join onto the top. No stock whatever, except that being worked on, is carried in the mill, but out in the stock shed is carried the finished stock from the mill, rough lumber stock for the mill, and standard stock in mill work that is brought already manufactured; and this stock shed is fully as interesting and important as the mill itself. In the first place, everything the concern can buy already manufactured, is carried in stock. This means not simply doors and sash, for those are really taken care of by a special arrangement, but casing, base, frame shooks and occasionally ready-made window frames, stock mouldings in both soft and hardwood—and some of this is in dust-proof bins.

The shed has a driveway through it lengthwise, and another crosswise, through which wagons can come right in to the end of the mill for loading when desired, and running along the outside is a railway sidetrack from which to take lumber right into the building direct from the cars.

One end of the stock building is given over mainly to rough stock for the mill, the softwood on one side



The Orderly Small Planing Mill.

and the hardwood on the other. And every bit of lumber is sorted for both length and width as it is put in stock, and all of it, even the oak, is thoroughly kiln-dried before it goes in. Then when a man wants one or any number of pieces of a given size for the mill, there is not a job of going out into the yard and tearing down a pile, but the stock is right there under shelter, in separate bins, and he can go and get what he wants without trouble or delay.

In the other half of the shed is carried standard stock in mill work and the stock from the mill that is waiting to go out on the job. Here there is a simple blackboard and bulletin system, the result of an idea of one of the juniors in the work. On every post in the spaces for jobs there is posted a blackboard, on which the man taking material from the mill to the stock room writes the name of the job it is for, so when the shipping clerk comes along he has but to glance at the blackboards to see whether a certain job is there or not, and to find just where it is.

Another and larger blackboard, in the form of a bulletin tickler, is now used, too, one for the mill foreman and one in the office, as a reminder and to furnish quick information about how far the work has progressed on any job. This board is about 2½ x 4 ft. and is cross-ruled, with starting space for the contract or order number and five spaces for checking. One space is for rough lumber, one for outside trim, one for flooring and one for finish. When the shipping clerk sends out rough lumber on a job, the job or contract number is posted, and he makes half a cross-mark in the beginning to show that he is working on it. This tells the mill foreman that the job is under way and that it is about time to start in on the mill work of that job; and as the work progresses it is a standing reminder and informant. Meantime a duplicate board is kept in the office, and from time to time the shipping clerk checks it up to correspond, so that the man in the office, if he has a telephone inquiry, does not have to go hunt up somebody or some record, but can glance at the bulletin board and tell at once just what shape the job is in and how it is coming along.

All this may sound to some of you like talking system more than machines, and it is, for the idea is to show the systematic handling of work in a modern small mill. It is well for every mill man to give attention to the fact that there is handling of stock both before and after the milling, and in this handling, as well as in milling, there is a chance to either make or lose money according as it is done. This is a sample instance of how it is done about as nearly just right as one can find.

A consular report from Sydney, Australia, contains the information that the use of Australian gum, otherwise known as ironbark, as well as spotted gum, for wagon stock, spokes, tool handles, etc., has greatly increased in recent months. Modern machinery designed especially to manufacture these articles has been installed, and, though considerable American hickory is still imported, the prospect is that Australia ultimately will be independent of that source of supply. Eucalyptus woods are not used for the finer classes of work in furniture manufacture, the more valuable Queensland maple and the wood of the bean tree being preferred. Some of these woods have been sent to the United States in the rough where they have been used for finer work and for ballroom floors, the latter being a purpose for which they are especially suited.

Hints on Sanding Oak

OAK, whether plain or quartered, is a comparatively easy wood to work smooth. It is not a soft wood, but what is meant is that oak can be worked on the planer and get a smooth finish with knives that are a little dull. The same thing is true in working it with saws. When it comes to gum and some of the other woods, the knives and saws must be perfectly keen to give good results. Now, when it comes to sanding, it is the other way. You may sand gum, or some other even-grained wood, with comparatively smooth or even slick sand paper and get fair results, but when it comes to sanding oak, to get a good finish, the sand paper should be fresh and sharp. This is because of the unevenness in the texture of the wood. If it is plain oak, there are the hard streaks and the soft streaks of the annual rings of growth and if they are sanded over with dull paper, it will cut down into the soft streaks and the hard ridges sticking up leaving an uneven surface. This might be all right for a certain kind of finish, but where a perfectly smooth face is wanted, one should sand oak with a sharp, clean paper. If it is quartered oak, it is the same thing in a different way. There is a hard film which makes the splash line which nothing but sharp paper will touch. If the wood is sanded over with dull or slick paper, it will simply dig down between the splash lines and leave them standing up in waves. To get good results, you should not only have sharp paper, but you should get the sanding across the grain or splash line to reduce the tendency to cut down the soft places between.

Planer Speeds

WITH the present tendency to connect electric motors directly on to the cutterhead of planers, there has been opened up for discussion and experiment again the old question of planer speeds. We have, in the past, had lots of testimony in favor of 4,500 revolutions as the maximum speed for the average planer head. With electric motors and direct connection cutterheads it has been impossible so far to get the electrical people to put up a motor built for more than 3,600 revolutions a minute. Some even balk at that idea, and there are those among mechanical men who contend that it is not good practice to use a motor of this high speed and connect it direct to the cutterhead of the planer. It is being done, though.

A direct connected motor of this kind built for 3,600 revolutions, will perhaps develop an effective working speed of from 3,200 to 3,400. This is considerably below some of the old cutting speeds for planers, but some of the well-posted manufacturers who have lately been experimenting with this matter, claim that it is speed enough to do good work. One man, who has designed and invented some machines of his own as well as done some of as nice work in hardwood as can be found, says that he has tried the experiment of reducing the speed on his hardwood planers and has found that he gets better results and requires less power. He reduced a four-knife machine down first to 4,000, and finally down to 3,500 and got better results at the lower speed than he did at the higher one. From this he figures that a direct connected motor which will give an effective working speed of 3,000 revolutions, or a little more, will furnish the cutting speed required in the hardwood trade.

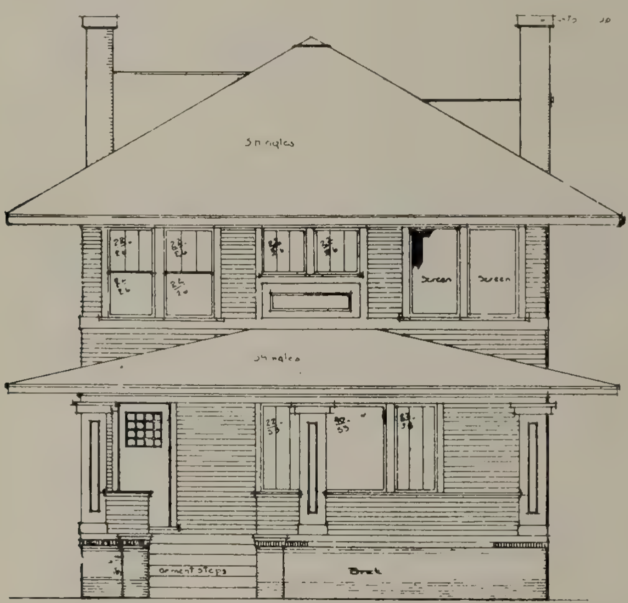
Carpentry and House-Building

A permanent department devoted to practical problems of construction and planning. Readers of the Canadian Woodworker are invited to contribute to this department and to submit details of work involving special difficulties.

Plans for Six-Roomed House of Moderate Cost

In constructing the house shown here, it was the desire of the builder to keep down the cost as much as possible and still maintain a feeling of solidity, interior roominess and comfort in the finished building. By adopting the square type and following simple lines this splendid result was obtained.

The plans show a large living room with fire place. This room in accordance with a popular custom, runs the full width of the house. Sliding doors open on



Front elevation of 6-roomed house

the dining room with its built-in buffet. The kitchen is conveniently placed along side of the dining room and has built-in cabinet, cupboard and ice box arranged for outside icing. The kitchen table is built in under the window.

Stairs lead directly from the living room to the second floor. Here are three bedrooms, spacious and with good closet room. The bathroom is so placed as to be easily reached from any bedroom. A nice sleeping porch opens off the front room. Special attention is directed to the placing of the windows which lend themselves most agreeably to the outside decoration and provide an unusual amount of light and air for every room.

Wood structure does not vary greatly in specific gravity, the difference in weight between the lightest and heaviest woods being a difference in the number and size of contained air cells. Any wood will sink if all the air is driven out and replaced by water, the wood substance (or substances, there being several) being heavier than water.

Painting New Interior Woodwork

By A. Ashmun Kelly

The priming coat for new wood is the same for both interior and exterior. But different woods require differing treatments. Thus, the priming coat for white pine would be different from that intended for cypress. Usually interior cypress work is varnished, finished by the hardwood finisher. But on the outside it is usually painted.

The best pigment for priming wood is pure finely ground white lead, and pure raw linseed oil is the best thinner. The priming may be heavier than that for exterior work, and is intended to serve as a filler. If yellow pine or cypress interior work is to be painted, then it is best to add considerable benzol to the paint, some using it entirely. The 160 deg. benzol, solvent naphtha, is the kind to use, or turpentine may be used in its place. Oil acts very badly on cypress, and on hard pine fails to secure a proper hold. Benzol and turpentine are penetrating, and the paint mixed with it for priming will stick well. Also benzol, and in a measure turpentine also, is a preventive of mildew. But it must not be used in any coat following the priming coat.

White pine knots must be shellaced with thin white shellac varnish, two coats on the bare wood, some advising coating on the priming coat. Shellac cut with pure grain alcohol is best for this purpose.

Use a partly worn brush for putting on the priming coat, as a new brush will not admit of an even application. Use too a round or oval, never a flat wall brush.

For second and other coats succeeding the priming coat use a rather stout paint, one that will admit of considerable rubbing out. A paint too thin to allow of this is not a good paint. A white, dead-flat job requires smooth work from start to finish. Careful brush work will greatly facilitate this. Putty up on the priming coat, making your own putty from white lead in oil and some whiting, with a trifle of good rubbing varnish, to toughen it. A few drops of turpentine will harden the putty. Such a putty will dry sooner than common store putty, is white, and sandpapers well. Store-putty would show up under five coats of pure white paint. Besides which there are sometimes when you need to glaze a place with the putty, to bring it up to a level, and this white lead putty will do that, and the other will not.

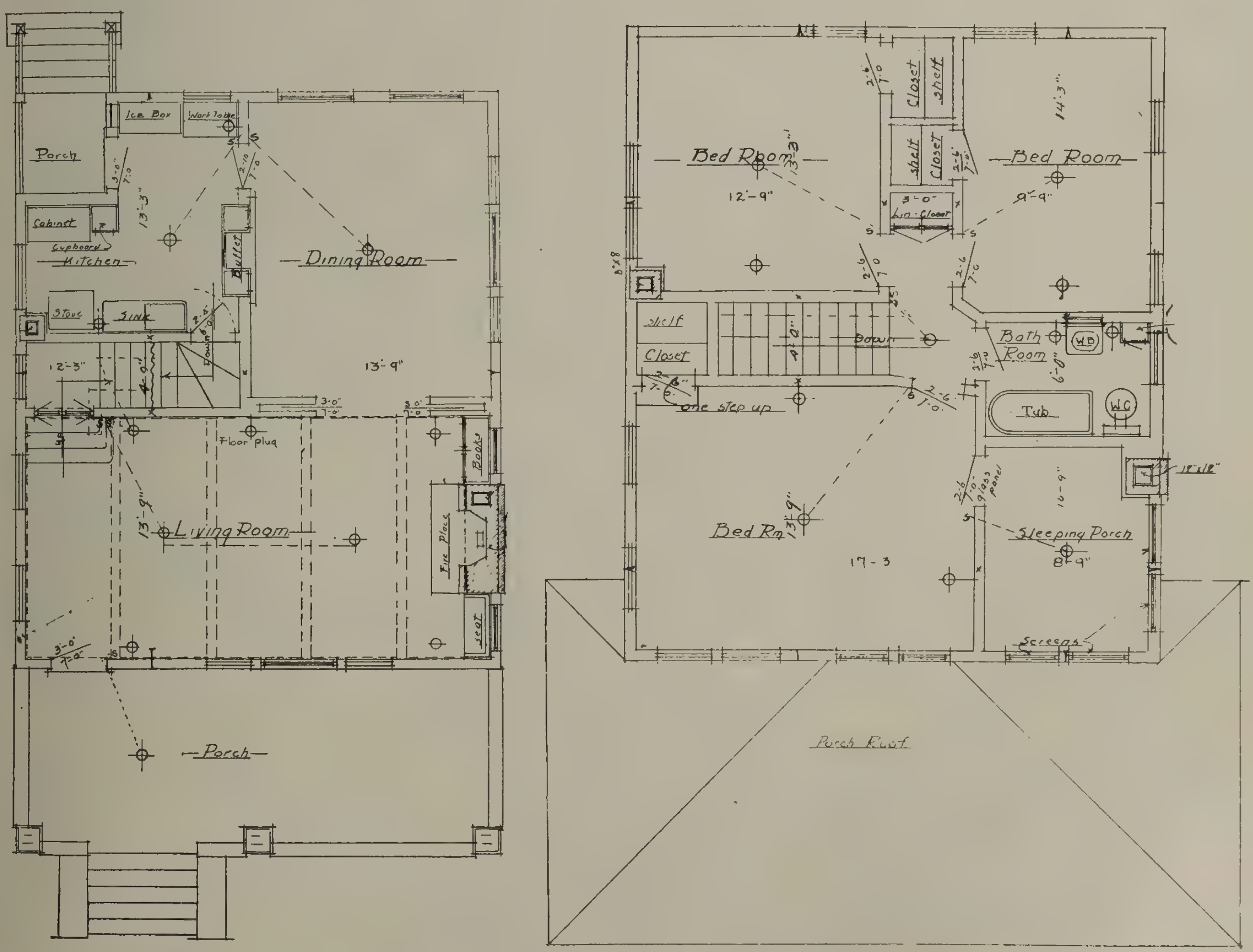
Should the wood show any discoloration, or if you have used dark or common putty, you can make good

Side and rear elevations of 6-roomed house

by slightly coloring the first white coat, say making it a gray, and this will make a solid or uniform surface, on which the following coats of white will not fail to cover well.

Pure white should have a sugar of lead drier, but white coach japan does well enough for an ordinary job of white. First-class white work demands the patent or lead acetate drier. What is known as patent drier is simply lead acetate (sugar of lead) and whiting.

To get a strictly first-class job of white flat work you must use drawn flatting, as follows: Mix up white lead with turpentine and let it stand for several hours, say over night. The oil in the lead will arise to the top and may be skimmed off. Repeat the process, or even remove all the liquid and wash out with turpen-



First and second floor plans, 6-roomed house

tine again, allowing it to stand again over night, or the equivalent number of hours. In this way you will get nearly all the oil out, while sufficient will remain to serve the purpose of a binder, but not enough to yellow the paint. Let me say here that lead paint does not yellow because it is lead, but because of the oil, and zinc white will do the same as lead when oil is present. Neither benzine nor turpentine substitute are as good as pure gum turpentine for this kind of painting. Neither is wood turpentine. Benzine will not flatten paint. Benzine also acts to yellow inside white paint, while pure gum turpentine acts to bleach it. Exterior white paint, though mixed entirely with oil, will become whiter with time, unless affected by sulphur, because sunlight bleaches the oil.

Interior woodwork may be painted in flat or oil color, and also be enameled. It may also be grained to imitate various hard woods. The priming is the same in all these cases. The addition of some turpentine to any interior oil paint tends to subdue the gloss and harden the paint. Turpentine also assists in drying the paint. An excessive use of driers in oil paint tends to soften it and also prevent it from drying as quickly as when a minimum quantity has been used. The excessive use of driers is to be shunned all the time. Very little need be used at any time, and this little should be of the best quality. If it smells rank of petroleum products reject it. When we consider what a little drier suffices surely it will occur to us that we can well afford to buy the best.

The Stairway in Building Construction

ONE of the most important details in the construction of a building is the stairway. On account of its importance as a decorative feature and practical use, it should be well designed and conveniently located.

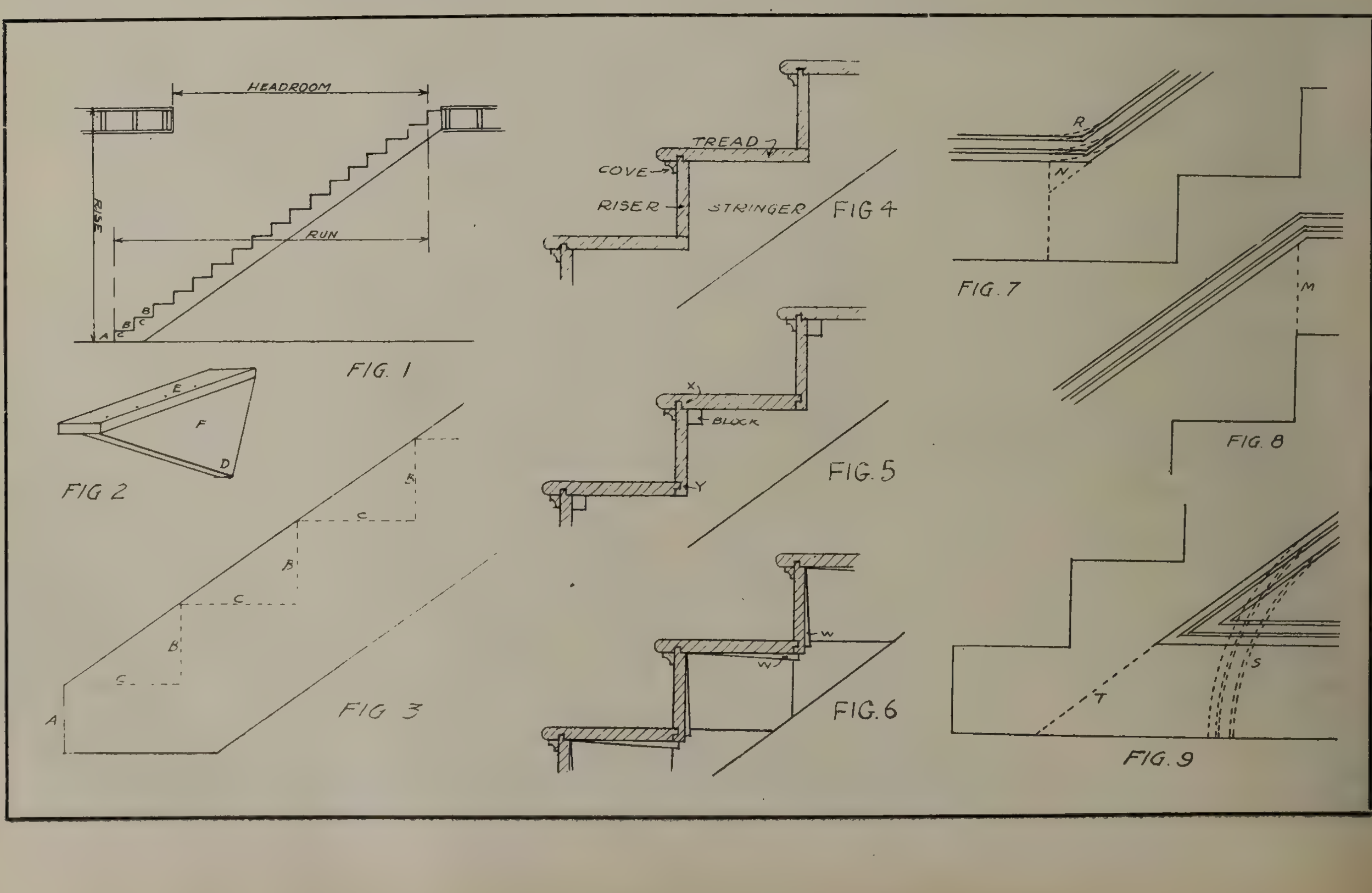
To determine the rise of each step, divide the total height from floor to floor by the number of risers desired. There are always one less tread than there are risers. The "rise" in residence work should be between seven and eight inches, and the treads from nine to ten and one-half inches. In stairways in large buildings the rise is often made less and the tread more than the above. It is a good rule to make the sum of two risers and one tread equal twenty-five inches.

Figure 1 gives the general layout of a simple stairway. Ample space for bedroom must always be allowed. On an ordinary stairway, if the header is placed over the fourteenth riser, counting down from the top, there will be sufficient headroom.

The run and rise of each step are usually laid out on the stringer with a steel square, but a pitch board (Figure 2) may be made with the board F made the exact size of the cut for each step and with the board E attached for a guide. The angle at D should, of course, always be a 90 deg. angle. By pushing the pitch board along the stringer, the successive steps may be marked as shown on Figure 3 and then cut out. The first riser A is always less than the other risers B by an amount equal to the thickness of the tread, usually $1\frac{1}{4}$ inches; unless the stringer is put in place before a finished floor is laid, in which case only the difference between the thickness of the tread and flooring should be deducted from the first riser.

Figures 4, 5 and 6 show various and usual methods of putting the treads and risers together and of attaching them to the stringers.

It will be noticed that the riser has a lip which fits into a groove in the tread. This lip is usually $\frac{3}{8}$ of an inch long and $\frac{3}{8}$ or $\frac{1}{2}$ of an inch in thickness.



In Figures 5 and 6 there is also a lip on the tread fitting into a groove in the riser. The blocks shown in Figure 4 should be spaced about a foot apart and should be 1 inch square and 4 or 5 inches long and securely glued in the angle of the tread and riser. In Figure 6 the stringers are grooved to receive the ends of the risers and treads and they are inserted from the back or under side of the stairs. These grooves in the stringer are made tapering with the top and front side horizontal and vertical, respectively. This allows space for the insertion of wedges, W which are well covered with glue before being driven. Stairs made in this way are strong and are perfectly solid under foot.

Figure 7 shows the manner of finishing the wall string at the foot of the stairs. A block, N is inserted and the cap mould of the base is carried through either by being mitred, or by using a curved piece as shown by dotted lines.

Figure 8 shows the method of finishing the wall string at the top of the stair, and Figure 9 shows the manner of treating the outside stringer at the foot of the stair. The cap of the baseboard is mitred and extended up along the under side of the stringer. Should the stair be open under, the finish may be made as shown by dotted lines. It is seldom customary, however, in present day residence work to leave the space open under a stair unless there is another stair descending to a still lower storey and even then it is frequently enclosed. The space is too valuable for closet purposes to be left unused.

Next month we shall continue along the same lines showing more in detail the construction of the stair and framing for same, and the month following several designs for stairs will be given.

The Perfect Glue

PERFECT glue is a chemist's dream that, like the elixir of life and the fountain of youth, has not yet been realized upon, comments the Furniture Manufacturer and Artisan. It is doubtful if many have a concrete specific idea of just what the ideal or perfect glue should be. We know in a general way of certain qualities it should possess. It should be commercially cheap, odorless and probably capable of being dissolved in or mixed with water for the sake of applying and then after once setting should be practically proof against moisture.

There are many special and near-ideal glues that can be made in which perhaps the odor can be practically eliminated and water-proofing can be secured; but glue of this kind is commercially cheap or there develops some other shortcoming.

It is pretty hard to get at the matter, too, by analyzing glue, studying its good qualities and its objectionable ones and trying to devise a way to rid the objectionable ones without interfering with the good ones. Often, however, it seems as if these things can be done. They look simple theoretically, but they are hard when it comes to practice.

Take, for example, the matter of odor. One authority on glue says the objectionable odor in glue is simply the beginning of decomposition of the material yielding sulphur and ammoniacal compounds. Now this furnishes a clue to work on. If the odor in glue is due to decomposition, which is very easy to believe from the nature of the odor, it would seem that all we need is something to arrest and eliminate the decomposition. It is this process of decomposition that makes glue spoil quickly. So, if we could eliminate the one, we would be rid of the other and kill two birds with one stone.

But, when we start to work on this theory, we encounter trouble. We find that moisture and heat are the most practical elements to use in making glue fluid so that it can be applied. Moisture and heat both encourage and hasten decomposition. So there you are. That is the explanation of why glue spoils quickly when mixed with water and is heated, and why it is important to clean up everything every day. Not only use up all of the glue that is mixed, but clean out the utensils so that there may be nothing left in the morning to contaminate the fresh glue.

Obviously, therefore, it is not practical to check decomposition when we have to use the very elements which hasten the process in mixing up glue and using it. Therefore, it follows that in a search for the ideal we must either turn to some other means of preparing glue for use, or else must go entirely back of that and get rid of the seeds of decomposition and implant in their place something of the nature of preservative.

There is probably where the chemist will find his biggest job. Glue, as we know it today, is quite generally the resultant product of the process of decomposition itself. Therefore, it is revolutionary to talk of eliminating this element and instilling in its place a preservative. Whether or not the chemist can work out this problem and give us a chemically pure glue remains to be seen.

Then there will be several others. One is to get a glue which can be mixed with water or made to flow readily by some means and yet after it has once set and hardened will not be susceptible to softening by the same process. This may sound impossible at first, and it may be so far as glue is concerned; but it is in practice in other lines right along. Take lime and cement, for example, which are used in the building trades as a bonding material. Water is the setting agent with these, yet after the water has been used as setting agent and the material once dries out and hardens, it cannot be again softened with water and, to a certain extent, it is water resisting. The explanation of this is found in the hardening process. In being treated with moisture, it hardens by a crystallizing process, which interlocks the particles together through the different voids forming a solid mass, which cannot well be broken down again by moisture.

The setting and hardening of the glue is evidently materially different from the setting of cement. Yet the fact that we have this example in the matter of lime and cement should lend some encouragement to experimenters in making glue, with the end in view of finding a glue which may be dissolved in water, which after once being in use and dried out, will resist the effect of moisture itself.

To make shellac varnish, either white or orange, take proof com. alcohol and in it dissolve the gum shellac—3½ lbs. per gallon. Put the alcohol and shellac in a wooden, glass or earthenware vessel, and agitate until dissolved. A tin or iron vessel darkens the shellac by its chemical action on the metal. White shellac will not turn any wood yellow or any other color. It will, however, darken slightly with age. White wood is not white; it is naturally yellow. The shellac will bring this out, just as wetting the wood would do.

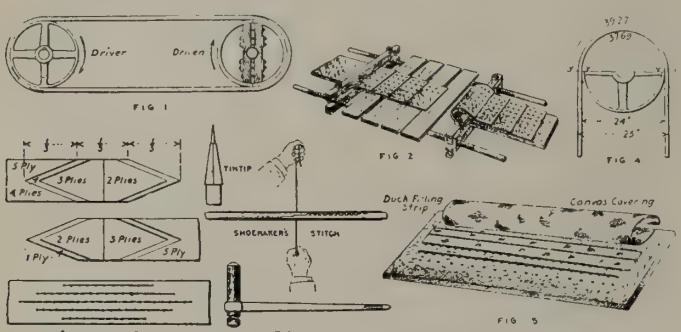
The Care and Repair of Rubber Belts

By Robert Moore

FROM time to time one sees articles on the splicing and general repair of leather belting, but rubber and canvas belts seem to have been neglected. Nevertheless, they need as much attention as their cousins of leather, particularly in the splicing. Some time ago the writer installed a 36-inch belt that was 50 feet between centers. As belts of this sort are prone to stretch when new, care should be taken in stretching the belt over the pulleys.

First allow one-eighth of an inch to each lineal foot of belt stretch, place the belt in position, put on the clamps and draw them tight. Do not be afraid of breaking the belt as five-ply 10-inch belt will stand a strain of 10,000 pounds, larger ones in proportion; the pulley will collapse first.

Take all the tension the bearings will stand, then turn the shaft slowly back and forth until the clamps touch the pulleys; taking up the slack as it is recovered from the upper half. Neglect to do this will stretch only one-half of the belt, and is apt to cause it to run out of line.



Stitching, splices and tools used in repairing rubber belts.

After thoroughly stretching the belt, proceed with the lap, which for a belt of this kind should be 45 in. long. Bear in mind that the lap should always point in the direction of travel over the pulley as in Fig. 1. By so doing any slip of the pulley will have a tendency to smooth down the lap.

Place the board on the clamp rods to rest the splice on; then draw a line squarely across the belt 47 inches from the end. Lay the section off in 2-inch holes where the lines cross. As there are six plies there will be three cuts or scarfs, as shown in Fig. 2. Cut a line just the depth of two plies at the 45-inch line and peel off these two thicknesses; do the same at the 15 and 30-inch lines.

Scarf the other end, place the halves together and punch holes in the lower half, inserting the punch in the holes in the upperhalf. By so doing, the holes will be directly opposite each other.

Cleanse the surfaces with naphtha and apply a liberal coating of the best rubber cement. Allow this to dry until it will not stick to the fingers, then place the laps together, starting at the edge and rolling the upper one out as it is being cemented so that air may not be entrapped between the surfaces. Then sew the outer edges, using the shoemaker's stitch, shown in Fig. 3.

Alternately roll and pound the joint until it is perfectly flat, then sew each row of holes as was done with the outer ones.

Cut filling strips the width of the space between lacings (most belt companies sell this duck all prepared), and give them several coats of rubber cement on each side. Clean the face of the belt between the laces with naphtha and give it a liberal coating of cement.

When each surface is dry, that is, when the finger placed lightly to the surface will not adhere, place the strips between the lacing and roll them down.

Now take a piece of duck, the width of the splice, but 4 inches longer, and cement this to the face of the belt, covering the joint. By so doing the lacings are protected and except for the occasional renewal of the outer covering the joint is as durable as the belt itself.

In sewing belts of this kind, tip the laces like a shoestring by bending a V-shaped piece of tin around the ends; another way is to use an eyed awl to pull the lace through the belt.

Belts smaller than 10 inches are butted and have a butt strap on the outer surface; this is known as the "back splice." Belts on grindstones, saws, rattlers, etc., where shippers are used will wear on the corners where they are butted, and the outer lace hole will soon tear away if this form of joint is not used. Shippers for belts of this kind should always be of the roller type.

In joining canvas belts always stagger the holes and do not have them less than 1¼ inches apart as the fabric is apt to crack across in cold weather.

Another form of joint, known as the "diamond splice," is used on generators with small pulleys as there is less shock when the lap passes over the pulley, eliminating all flicker of the lamps.

The diamond splice is made in much the same manner as the lap splice except that the scarfs are divided into three equal parts and cut as shown in Fig. 3; it is not so strong a joint as the lap splice, but it is more flexible, therefore better adapted to small pulleys.

Many condemn rubber belts as too cheap or they consider them as a poor substitute for those of leather. This is a mistaken idea. I personally know of rubber belts that have been in continuous operation for years under most exacting conditions, such as dust-laden grinding rooms, dyehouses where the belts were drenched with moisture and outdoor drives subject to all weather conditions.

I would not advise using rubber belts on small pulleys as the outer side of the belt must stretch and the side next the pulley compress. This creates a forward and backward motion between the plies of the belt and is apt to separate these plies.

On a given arc the stretch and compression are the same for one thickness of belt, so that increasing the diameter of the pulley lengthens the life of a belt as the stretch and compression are less per foot. As the thickness of the belt increases so should the diameter of the pulley.

For instance, the arc of a belt ¼ inch thick, on a 2-foot pulley, would measure 37.69 inches next to the face of the pulley, while the outer edge would measure 38.48 inches, a total distortion of 0.79 inch. If the belt were ½ inch thick the outer edge would measure 39.27

inches, giving a total distortion of 1.58, just twice as much; see Fig. 4.

So when more power is wanted and it is not advisable to increase the size of the pulley, better results are obtained by widening the belt and pulley face than to increase the thickness of the belt.

To increase the diameter of the pulley to 48 inches would give a total distortion of 1.58 inches when using a ½-inch belt, but as the arc would measure 75.4 in., the distortion for each lineal foot would be halved.

Animal fats and grease should never be used on rubber belts. Boiled linseed oil is good; also equal parts of black lead, red lead, French yellow, litharge and enough japan dryer to make it dry quickly. This will give a smooth polished surface.

The Inventor of the Saw

By M. B. Wynkoop

FOR the inception of many of our modern tools, we are forced to go back to the myths of ancient Greece. Just to what extent we can rely upon these myths for exact knowledge of the beginnings of modern invention, or developments is hard to say. Many of them are accepted by men of science as fairly accurate, only the details varying in the stories that have been handed down to us from the writings of the ancient Greeks, the scribes of their times.

We are certain that many of our more simple present day agricultural implements had their inception in the rudely designed and crudely constructed tilling instruments of ancient times, and it is perhaps reasonable to believe that some of our modern woodworking tools also date back in principle to some where near the same time in history.

The story of the probable first idea of the saw principle is rather interesting to the user of the modern saw. It dates back to about 1200 B. C.

The invention of the saw proper is attributed by the ancient Greeks to Talos, nephew of Daedalus, and Grandson of a King of Athens. Daedalus was undoubtedly the most skilled artist that Greece of his time produced, a great inventor, architect and sculptor.

Daedalus, meaning probably to perpetuate something of his ability as an inventor, as well as securing some needed assistance in his work, undertook the education of his nephew, Talos, in the arts, as well as the crafts of the time. Talos showed great aptitude in the sort of work his uncle gave him, and he must have had something of the genius of his uncle, for he showed such prococity as to rival him in the scope of his inventions. Three of these are the saw, the lathe and the compass.

From contemplation of the Potters wheel, Talos invented the lathe. Becoming possessor of the jawbone of a serpent, he used it in trying to cut through a piece of wood. Later on he reproduced the shape of the serpents teeth in metal, forming a sort of saw.

Thus Talos is accredited with giving us the beginning of such perfect tools as the various types of saws in use to-day certainly are.

But, to carry the story of Talos further the joy of his achievements was short lived, for when he made known his inventions, especially the saw, his fame became so great that it excited the jealousy of his uncle, Daedalus. Apprehensive of the rivalry of his nephew, and undoubtedly becoming envious of his growing fame, Daedalus lured him to the top of the Acropolis, cast him down and buried him secretly.

The subsequent history of the saw is very obscure. It was probably not until the seventeenth century that a new saw form was used, and then it was the circular, and it wasn't until early in the nineteenth century that the band saw was invented. Even then it was nearly forty years afterward before it came into practical use.

Power with Speed

In the discussion of the performance of work by mechanical power the engineer finds himself facing the question of accomplishing two things; First, the production of sufficient power to overcome the resistance opposed to him, and, second, the imparting to this power of the speed. We will say a force of 200 lbs. can do no work until it is given a velocity, until it is made to travel a given number of feet per second, until it is converted into foot pounds.

A natural consequence of these facts is that it matters but very little, at least, theoretically, which of the two elements is the larger. We may have a few pounds moving very rapidly, or a larger force moving proportionally slower, and the amount of power developed will be the same. The whole art of engineering has shown the development from the heavy, slow-moving power to the high-speed combination, a natural consequence of the improvement in constructive possibilities.

In the earlier days of mill construction it was thought possible to transmit power only by heavy, slow-moving shafting and gearing. The use of belting and pulleys was considered trifling, and adapted only to very light machinery. The moderate frictional hold of the belt upon the pulley and the correspondingly lower strength of the belt, as compared with the ponderous cog wheels, led to such conclusions, until it was realized that the greatly increased speed of the belt enables ample power to be transmitted. It was the same combination of power and speed, and if the force was smaller the motion was faster; and the power transmitted was as great in one case as in the other.

Still later, when it was proposed to use rope drive for many purposes, the same misconception stood in the way. The old-time machinist, who laughed at the idea of attempting to drive his lathe with a "piece of twine," opened his eyes when he saw that the swift running rope could pull him through a cut which had caused his old belt to leave the pulley.

At the present time these things are better understood, and with the development of the science of the transmission engineer it has been found possible to meet almost every demand, and to deliver power with certainty and efficiency to any point where it is needed. The result is a rapidly extending use of power for many purposes for which it was formerly considered inapplicable. In every part of the shop power is readily attainable, whether delivered by belt, rope or electric wire. Men now use their brains to direct their hands in the guidance of power-driven tools for nearly every operation, with a resulting increase in capacity and efficiency beyond estimate. What the development has done to increase the power-transmission facilities to wood-working plants is beyond calculation.—The Woodworker.

A manufacturing toy company in the United States started out to use only the waste wood from other mills. It has worked out a system of using all small waste pieces so that practically nothing but the sawdust is lost. The example is applicable to other branches of the industry.

Destruction of Dry Rot in Wood

Frederick J. Hoxie, of Phenix, R.I., presented a paper before the Boston Section of the American Society of Mechanical Engineers in which he gave the results of some experiments made on the destruction of lumber in buildings of slow-burning construction. Extracts from the essay are appended.

One experiment was to determine whether the rosin in long-leafed pine heartwood was an important factor in resistance to fungus.

A cubic block of dense fine-grained wood two ins. on a side, containing 18 per cent. rosin, was sawed in two across the grain, and half of it was boiled in benzole until practically all the rosin was removed. The solvent was driven off, and a piece of wood containing living dry rot fungus was placed between the two blocks.

The whole was placed in a moist atmosphere and the fungus allowed to grow for a year, at the end of which time a dense white growth had formed over each block. This growth was removed, the blocks dried and weighed.

The specimen from which the rosin was removed had lost 8 per cent., the other only 2 per cent. Neither showed the brown color characteristic of rotten wood until after they had been dried for some time..

Dry rot fungus, though not as common as several other varieties, has a thermal death point less than 100 degrees F., so that the practical application in the case of these fungi is that they may be destroyed in many cases by use of the building heating system. A badly infected mill can be given a cure or one can get good results if the heating is applied soon enough, but the author asserted that the cure is not likely to affect the growth of the fungi in the ends of beams in the brick wall where the heat does not readily penetrate. It is suggested that when there is any question as to the quality of the stock used in the building, heat is worth trying and this should be done as soon as possible after the building is completed.

Several of the more common fungi which destroy basement floors, fence posts and railway ties are capable of resisting temperature up to the boiling point of water. It appears also that these fungi have strands sometimes several feet long, capable of travelling for some distance across masonry or metal from beam to beam.

The kyanizing process of treating timber with corrosive sublimate solution has been used more or less frequently with good results. Although its cost, corrosive qualities and poisonous nature have probably operated to prevent its more general use, it appears to be well adapted to treatment of factory lumber.

Chloride of lime appears to encourage the disease rather than remedy it.

The season for cutting timber seems to have only a secondary importance, but the dryness of the wood, whether the moisture be sap or rain water, is an important factor. Preserving timber under water prevents fungus growth while the material is in storage, as fungus cannot grow without an air supply. It may also have some benefit in dissolving from the outer parts of the wood where infection must start some of the nitrogenous constituents which serve as food for fungi. Further investigation is, however, needed along the line of the chemistry of seasoning and heart foundation.

Quick-growing timbers will continue to come into more general use owing to their more rapid production. Hard pine, to be able reasonably to resist fungus in building construction, without antiseptic treatment, should contain about 10 per cent. of rosin.

Artificial saturation of wood with rosin has been tried without very satisfactory results, owing to the lack of penetration. It should not absorb over 5 pounds of water per cubic foot in 24 hours at 70 degrees F., from kiln-dry conditions, and should weigh not less than 38 pounds per cubic foot kiln-dry. These characteristics generally accompany fine-grained material, and with them fine-grained material is better than coarse-grained, while without them the fine grain does not appear to be a saving quality.

Badly Working Sander Roll

A man who had purchased a large three-roll second-hand sander, recently complained of trouble in one roll which gave a sharp click at each revolution when turned by hand, but the clicking ceased as the roll revolved at normal speed. This roll never would turn out smooth work, but was continually scratching or gouging the work that passed under it.

After two or three machinists had looked the roll over, and given no end of advice, it was taken out of the machine, sent to the shop and put in a lathe. The first thing found was that the shaft was untrue. There seemed to be a bend in each end of the shaft close to the ends of the roll. The roll was stripped, the shaft straightened and its bearings trued up.

As soon as the metal case of the roll was removed the cause of the clicking became evident. There were several links inside of the sander roll attached at either end by means of an ordinary cap screw. In this roll several of the cap screws had worked loose, and both screws in one link had worked entirely out of their threads leaving the link loose in the cylinder where it rolled from side to side together with the two cap screws which should have held it in place. As the roll gathered rotative speed the links would be carried around against the circumference and therefore could not make a noise, but the addition of a pound or two of metal to one side of the roll proved detrimental to the balance of that moving body and as a result the roll thumped around in every direction and, strange to say, never ran alike for two successive times.

This was due entirely to the unbalancing of the roll by the links and set screws, and as this metal was deposited at different times against different portions of the roll casing it was evident that while one side of the roll would be high at one time it would be low at another time, because the links had been deposited somewhere else. Wherever the links chanced to be, there would be a high spot when centrifugal force got to work.

It was found necessary to put in new wooden pieces, as the old ones had become so badly cut up by the tacks and nails that they failed to hold the roll covering satisfactorily.

The next problem was to cover the roll with some suitable material. Felt is preferable for this purpose, but no felt was obtainable. Neither was carriage-maker's carpet to be had. This variety of carpet makes a very fine covering for rolls, but it is very expensive and should be used only in case of emergency. The matter was finally fixed up by purchasing several yards of table felt. As many thicknesses as required were cut from this material and tacked smoothly around the circumference of the roll. Although it proved a little more trouble to apply the table felt, it was found that just as good a job was done with that material as could be done with thick felt properly.

Equipment and Application of the Variety Saw

The Variety Saw has long been recognized as an important tool in carpenter shops, retail lumber yards, etc. One of the latest improvements in the variety saw is now being placed on the market by the J. A. Fay & Egan Company. From the illustrations and description given here, it will be seen that the 330 and its combinations is an excellent tool. The special care taken in the design and construction of this machine is such that all adjustments are easily and quickly made—a feature that will appeal to one from the economical viewpoint.

Fig. 1

The 330 Variety Saw is maae in two sizes to meet the requirements of the purchaser. The larger size shown in Fig. 1, has a 36-in. by 42-in., heavily ribbed, cast-iron table mounted on rockers and angles 45 degrees by hand wheel and screw, a micrometer index showing the exact angle of tilt. A wooden throat plate is provided so that molding, jointing, dadoing, grooving, rabbitting or gaining heads up to 2-in. wide may be used. As will be seen in Fig. 1 the fence equipment is elaborate, consisting of a bevel ripping fence for angle sawing and one for plain ripping on either side of the saw but by loosening a single thumb screw, the hood may be removed for easy access to the blade.

Fig. 2

The small size of the 330 (330-C) is similar to the 330 regular excepting that the table, which is 26-in. by 30-in. and the fence equipment is not so complete. However, the fences are sufficient to take care of all ordinary work. The column and adjustments are duplicates of the regular machine in size and weight.

Fig. 2 shows the 330-A, which is the 330 regular with hollow chisel mortising and boring attachment. This type is really a complete woodworker. Mortises from ¼ to ¾-in. by 3-in. deep are made in stock up to 16 ins. by 8 ins. A 19-in by 10-in. table is carried on a cast iron frame with 8-in. vertical adjustment and moves 5 ins. on dovetail slides by means of foot treadle and iron links. This means of moving table is a feature as rope or chain are liable to break. The back fence is adjustable in T-slots and a front fence is provided to hold stock when withdrawing the chisel. Fig. 2 also shows the table tilted.

Fig. 3

When the mortising attachment is not necessary, the 330 is equipped with boring attachment only, as shown in Fig. 3. This attachment is similar in construction and capacity to the hollow chisel mortising attachment except that the chisel holder, front fence and foot treadle are eliminated. To make this variety saw as safe as possible, the aluminum saw guard manufactured by this company, will be fitted to either type. It is shown applied in Fig. 3 and notice is called to the absence of overhead rigging. This guard gives the most efficient protection without interfering in any way. Boring and mortising attachments can be fitted to the smaller size as well as the larger one.

An interesting bulletin on this machine will be sent to anyone on request to J. A. Fay & Egan Company, 153-173 West Front Street, Cincinnati, Ohio.

Luther B. Smith, whose mill at Blissville, Sunbury County, N.B., was destroyed by fire some time ago, will probably erect a mill at Gagetown, N.B. His intention is to erect a band saw mill with rotary equipment as well, also a shingle plant and planing mill. The capacity of the mill will probably be about 50,000 feet per day. Mr. Smith owns timber limits on the Nerepis.

Trade Happenings and Opportunities

Woodworking News—From Coast to Coast

The Dougall Varnish Company, Limited, Montreal, P.Q., are building a large addition to their factory.

R. Truax & Son, Walkerton, Ont., are building a new sash and door factory to cost in the neighborhood of $7,000.

Fire recently destroyed the carriage factory of W. H. Moore, Bobcaygeon, Ont. The factory will likely be rebuilt.

E. T. Nesbitt, Quebec, P.Q., is having plans prepared for the construction of a woodworking factory at Limoilou, Quebec.

The planing mill of W. F. Fraser at Ottawa, Ont., was recently destroyed by fire. The loss is partially covered by insurance.

Two factory buildings are to be erected at Owen Sound, Ont., by the Keenan Woodenware Manufacturing Company, of that city.

Messrs. Convery and Gallows are building a three-storey furniture factory at Battleford, Sask. The building is already up two-storeys.

The cooperage shop of John Paxton & Company, Montreal, Quebec, was recently destroyed by fire. The loss will amount to $8,000.

The new factory of the Hebner Furniture Company, Berlin, Ont., is about completed. Heating and plumbing fixtures are at present being installed.

Otto Higel Company, Toronto, Ont., have called for tenders for the construction of a 1-storey, brick and re-inforced concrete dry kiln to cost $2,000.

F. Tremblay and Company's lumber and sash factory mill at Montreal, Que., was partially damaged by fire recently. The loss is covered by insurance.

Mr. J. C. Anderson who has been placed in charge of the woodworking classes at the Industrial School, London, Ont., assumed his new duties a few days ago.

A woodworking factory is to be erected in Montreal at a cost of $60,000 by the Malone Moulding & Framing Company, of 48 Beaver Hall Hill, Montreal.

It is reported that the Trenton Cooperage Company, Trenton, Ont., have gone out of existence and the business has been taken over by an English syndicate.

Excavations are in progress on the new factory of the Preston Chair Company, at Preston, Ont. The building is to be three-storeys high, of brick construction.

During a severe electrical storm at Big River, Sask., the planing mill of the Big River Lumber Company was struck by lightning and completely destroyed by fire.

The timber mill of J. R. Booth, Ottawa, was damaged by fire to the extent of $100,000, a few days ago. The mill destroyed was a comparatively new one, having only been built three years.

The Andrew Malcolm Furniture Company, Limited, are contemplating an addition to their furniture factory at Listowel, Ont. The head office of this company is at Kincardine, Ont.

The Reliance Sash & Door Company's interests have been absorbed by the Imperial Timber & Trading Company of Vancouver. The new board comprises: President, E. L. Kinman; vice-president, T. Frank Paterson; general manager, R. B. McKamey; treasurer, George P. Challenger; secretary, H. G. Ross.

The factory of the Kensington Furniture Company, Goderich, Ont., was recently destroyed by fire. The loss will be in the neighborhood of $40,000. The company will likely rebuild.

The planing and lumber mill of Levi M. Bowman, of Heidelburg, a short distance from Berlin, was badly damaged by fire recently. The loss will be about $4,000, partly covered by insurance.

The Carriere Company, of 31 Laurier Ave. East, Montreal, are contemplating the erection of a sash and door factory. They are reported to be looking for a site where they will erect a complete plant.

Work has started on alterations to the excelsior and box factory at Saguenay Mills, Limited, St. Ambroise, Montreal. Premises have been purchased near the present buildings and these are being adapted to the requirements of trade.

From Ottawa comes a report that J. R. Booth is thinking of erecting wood mills at a cost of $100,000. If the buildings go up they will be of reinforced concrete and fireproof throughout. The cost given is inclusive of machinery.

The Metropolitan Furniture Company, Hamilton, Ont., recently suffered a loss when fire destroyed their warehouse and the furniture which was stored there. The damage is estimated at $6,000, covered by insurance.

The Vancouver Box Company, Limited, was recently incorporated at Vancouver, B.C., with a capital of $100,000. One of the purposes of the company will be to carry on a general lumbering business in all its branches.

As a result of the heavy fruit crop in the Niagara peninsula, the basket manufacturers have taken advantage of the scarcity of baskets and have considerably advanced the prices. Fruit growers are feeling the situation very keenly.

Fire completely destroyed the big planing mill of Oscar C. Teal, contractor, Bridgeburg, Ont., a short time ago. A considerable quantity of dressed lumber was also burned. The total loss is estimated at $20,000, partly covered by insurance.

The Dominion Mahogany & Veneer Company, Limited, Montreal West, have just made some heavy purchases of logs. These include 250,000 feet of Mexican logs, which amount to 23 car loads, a lot of veneer logs, and 500,000 African logs.

At Jonquieres, Que., early this month the sash and door factory of La Cie Manufacturiere de Jonquieres was damaged by fire to the extent of $20,000. The owners are stated to have plans for rebuilding and to be in the market for new machinery.

A farm machinery factory is a prospective industry for the city of Medicine Hat. Those behind the project are the Gilbert Hunt Company, of Walla Walla, Wash., who have applied to the city council for lots. The estimated expenditure is stated at $50,000.

A disastrous fire occurred at Midland recently when the lumber in the mill yard of Chew Bros. was totally destroyed. The lumber was the property of The Hettler Lumber Company, the Freeman Lumber Company, Georgian Bay Shook Mills, and Chew Bros., of Midland, and J. G. King and Com-

pany and C. A. Larkin, of Toronto. The loss will amount to about $250,000.

The town of Bradford, Ont., recently passed a by-law granting a bonus of $20,000 to Watson-Smith Company, Limited, Toronto, Ont., for the purpose of erecting a building to carry on a woodworking business, and to manufacture wire screens and the like.

The Fort Qu'Appelle Boat Building and Wood Manufacturing Company are contemplating building a planing mill plant to cost $42,000. The plant will include a woodworking shop, planing mill, and boat building shop, all to be constructed of brick, frame and concrete.

On the first of the month, the Empire Lumber Company started operation at their new mill at Deep Bay, Cowichan Lake, B.C. When running to capacity the mill will have a capacity of 25,000 ft. daily and is to be equipped with the most modern machinery known to the lumber industry.

Recent British Columbia incorporations include McAllister's, Limited, incorporated with a capital of $250,000 for the purpose of carrying on the business of manufacturers and importers of and wholesale and retail dealers in all kinds of furniture, fixtures and fittings. The head office of the company is to be at New Westminster, B.C.

The Bridgeport Lumber Company, Limited, has been incorporated with a capital of $250,000 for the purpose of carrying on a general lumber and woodworking business. The company have the right to manufacture and deal in sash, doors, mouldings, casings and all other finished products of lumber. The head office is to be at Vancouver, B.C.

The World Wants This Man

By Berton Braley

We seek him everywhere
Amid the throng.
We've sought him here and there
And sought him long,
Hoping among the mob
He'll chance to dwell—
The man who knows his job
And does it well!

We know of labor's woes,
Nor hold them light,
But ah, the man who knows
His business—right!
Workman, or cop, or clerk—
He makes a hit,
The man who knows his work
And tends to it!

The world has constant use
For men like this.
Who's work's not fast and loose
And hit or miss.
It seeks, with heart athrob,
Where he may dwell—
The man who knows his job
And does it well.

BUYER'S DIRECTORY

AUTOMATIC DOVETAIL GLUE JOINTER
Canadian Linderman Machine Co., Ltd., Woodstock, Ont.

AUTOMATIC GLUE CLAMP CARRIER
Nels J. Billstrom, 1315 Tenth street, Rockford, Ill.

BABBITT METALS
Shurly Dietrich Co., Ltd., Galt, Ont.
Fay & Egan Co., Cincinnati, O.
Canada Metal Co., Ltd., Toronto.

BALUSTER LATHES
C. Mattison Machine Works, Beliot, Wis.
Thos. White & Sons, Paisley, Scotland.
Chicago Machinery Exchange, Chicago, Ill.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.
Canada Machinery Corp., Ltd., Galt, Ont.

BAND SAW FILING MACHINERY
Shurly Dietrich Co., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

BAND SAWS
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Shurly Dietrich Co., Ltd., Galt, Ont.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
R. H. Smith Co., Ltd., St. Catharines, Ont.

BAND SAW MACHINERY
American Woodworking Machinery Company, Rochester, N.Y.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
H. W. Petrie, Ltd., Toronto.

BAND SAW MILLS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., Cincinnati, Ohio.

BAND SAW STRETCHERS
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

BENDING MACHINES
American Woodworking Machinery Company, Rochester, N.Y.
Fay & Egan Co., Cincinnati, Ohio.

BELTING
J. A. Fay & Egan Co., Cincinnati, Ohio.
Sadler & Haworth, Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
H. W. Petrie, Ltd., Toronto.

BELTS (Endless)
Candada Machinery Agency, Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Sadler & Haworth, Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
H. W. Petrie, Ltd., Toronto.

BELT CEMENT
Sadler & Haworth, Montreal.

BELT FASTENERS
Sadler & Haworth, Montreal.

BELT DRESSING
Sadler & Haworth, Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

BLOWERS
Sheldons Limited, Galt, Ont.
H. W. Petrie, Ltd., Toronto.

BLOW PIPING
Cyclone Blow Pipe Company.
Sheldons Limited, Galt, Ont.

BOILERS
Canada Machinery Agency, Montreal.
H. W. Petrie, Limited, Toronto.

BORING MACHINES
American Woodworking Machinery Company, Rochester, N.Y.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Mussens, Limited, Montreal.
J. M. Nash, Milwaukee, Wis.
Valley City Machine Works, Grand Rapids, Mich.
H. W. Petrie, Limited, Toronto.

BOX MAKERS' MACHINERY
American Woodworking Machinery Company, Rochester, N.Y.
Canadian Linderman Co., Ltd.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.

BROKEN CASTINGS BRAZED—MACHINIST AND DIE MAKER
W. H. Dunne, 1492 Queen St. West, Toronto.

CABINET PLANERS
Canada Machinery Corporation, Ltd., Galt, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Agency, Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Valley City Machine Works, Grand Rapids, Mich.
Baxter D. Whitney & Son, Wichendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Ltd., Toronto.

CARS (transfer)
Sheldons Limited, Galt, Ont.

CARVING MACHINES
American Woodworking Machinery Company, Rochester, N.Y.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Hespeler Machinery Co., Ltd., Hespeler, Ont.
Valley City Machine Works, Grand Rapids, Mich.

CHISELS
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

CIRCULAR SAW MILLS
Canada Machinery Agency, Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
H. W. Petrie, Limited, Toronto

CHAINS (Silent)
Jones & Glassco, Montreal

CLAMPS (Chain, Carpenter, Cabinet, Pattern Makers, Bench, Mitre, Piling, Mounted and Rotary Wheel)
Batavia Clamp Company, Batavia, N.Y.
Black Bros. Machinery Co., Mindota, Ill.
J. A. Fay & Egan Co., Cincinnati, Ont.

CLAMPS (Saw)
Shurly Dietrich Co., Ltd., Galt, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

CLUTCHES
J. A. Fay & Egan Co., Cincinnati, Ohio.

COLUMN CLAMPS
Black Bros. Machinery Co., Mendota, Ill.

COLUMN MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.

CORE BOX MACHINES
J. A. Fay & Egan Co., Cincinnati, Ohio.
Chicago Machinery Exchange, Chicago, Ill.
E. & B. Holmes Machinery Co., Buffalo, N.Y.

CUT-OFF SAWS
Canada Machinery Corporation Ltd., Galt, Ont.
Shurly Dietrich Co., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Berlin Machine Works, Ltd., Hamilton, Ont.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

CUTTER HEADS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Lamson Cutter Head Company.
Samuel J. Shimer & Sons, Galt, Ontario.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

DADO HEADS
C. Mattison Machine Works, Beloit, Wis.
Fox Machine Company, Grand Rapids, Mich.
W. A. Elliott, Bathurst and College Sts., Toronto.

DIEMAKERS & MACHINISTS
W. H. Dunne, 1492 Queen St. West, Toronto.

DISK GRINDERS
J. A. Fay & Egan Co., Cincinnati, Ohio.

DOGS (Saw Mill)
J. A. Fay & Egan Co., Cincinnati, Ohio.

DOVETAILING MACHINES
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canadian Linderman Machine Co., Ltd., Woodstock, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

DOWEL MACHINES
American Woodworking Machinery Company, Rochester, N.Y.
Thos. White & Sons, Paisley, Scotland.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Dauber-Bell Machine Company.
J .A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Valley City Machine Works, Grand Rapids, Mich.

DRYING MACHINERY
Sheldons Limited, Galt, Ont.
Morton Dry Kiln Co., Chicago, Ill.

DRY KILNS
Sheldons Limited, Galt, Ont.
Morton Dry Kiln Company, Chicago, Ill.

DUST COLLECTORS
Sheldons Limited, Galt, Ont.

DUST SEPARATORS
Sheldons, Limited, Galt, Ont.

EDGERS (Gang)
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machinery Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

EDGERS (Single Saw)
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Agency, Montreal.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

END MATCHING MACHINE
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

ENGINES (Steam)
H. W. Petrie, Limited, Toronto.

EXHAUST FANS
Sheldons, Limited, Galt, Ont.

FLOORING MACHINES
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corporation, Ltd., Galt, Ont.
Baxter D. Whitney & Son, Winchendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

FLINT
Wausau Quartz Co., Wausau.

FLUTING HEADS
J. A. Fay & Egan Co., Cincinnati, Ohio.

FLUTING AND TWIST MACHINE
Pryibil Machine Co., P., New York.

GAINING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Canada Machinery Corporation, Ltd., Galt, Ont.
H. W. Petrie, Limited, Toronto.

GAS ENGINES
H. W. Petrie, Limited, Toronto.

GAUGES (Saw)
Shurly Dietrich Co., Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver B. C.

GLUE CLAMPS
Batavia Clamp Company, Batavia, N.Y.
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.

GLUE HEATERS
J. A. Fay & Egan Co., Cincinnati, Ohio.

GLUE JOINTERS
American Woodworking Machinery Company, Rochester, N.Y.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canadian Linderman Company, Limited, Woodstock, Ont.
Chicago Machinery Exchange, Chicago, Ill.

GLUE SPREADERS
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

GRINDERS (Cutter)
J. A. Fay & Egan Co., Cincinnati, Ohio.

GRINDERS (Knife, etc.)
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

GRINDERS (Tool)
J. A. Fay & Egan Co., Cincinnati, Ohio.
Valley City Machine Works, Grand Rapids, Mich.

GROOVING HEADS
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Samuel J. Shimer & Sons, Milton, Pa.
Canada Machinery Corporation, Ltd., Galt, Ont.

HAND PROTECTORS
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Jones Safety Device Co., Hamilton, Ont.

HAND SCREWS
Black Bros. Machinery Co., Mendota, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

HEATING APPARATUS
Sheldons, Limited, Galt, Ont.

HANDLE AND SPOKE MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
J. M. Nash, Milwaukee, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.

HUB MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

HYDRAULIC VENEER PRESSES
Wm. R. Perrin & Co., Ltd., Toronto.

INJECTORS
H. W. Petrie, Limited, Toronto.

JOINTERS
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canadian Linderman Co., Ltd., Woodstock, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Plessisville Foundry, Plessisville, Que.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

KNIVES (Planers and Others)
Shurly Dietrich Co., Ltd., Galt, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Samuel J. Shimer & Sons, Milton, Pa.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
H. W. Petrie, Limited, Toronto.

LACE LEATHER
Sadler & Haworth, Montreal.

LATHES (Pattern Makers')
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Valley City Machine Works, Grand Rapids, Mich.
H. W. Petrie, Limited, Toronto.
Thos. White & Sons, Paisley, Scotland.

LATHES (Turning)
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Valley City Machine Works, Grand Rapids, Mich.
Baxter D. Whitney & Son, Winchendon, Mass.
H. W. Petrie, Limited, Toronto.

LOOSE PULLEYS
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corporation, Ltd., Galt, Ont.

LUBRICANTS AND GREASES
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.

LUMBER
Anderson Lumber Company, C. G.
Elgie & Jarvis, Toronto.
Oliver Lumber Company, Toronto, Ont.

MACHINE KNIVES
Walters & Sons, H., Hull, Que.

MITRE MACHINES
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N. Y.
H. W. Petrie, Limited, Toronto.

MITRE SAWS
Shurly Dietrich Co., Ltd., Galt, Ont.
E. C. Atkins & Co., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corporation, Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

MITRE CLAMPS
Batavia Clamp Company, Batavia, N.Y.
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.

MORTISING MACHINES
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Jones & Glassco, Montreal.
Valley City Machine Works, Grand Rapids, Mich.
H. W. Petrie, Limited, Toronto.

MULTIPLE BOXING MACHINES
J. A. Fay & Egan Co., Cincinnati, Ohio.
J. M. Nash, Milwaukee, Wis.

PACKINGS
Both Felt Company

PAINTS AND VARNISHES
Jamieson & Co., R. C., Montreal.

PATTERN SHOP MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

PICTURE FRAME MACHINERY
Black Bros. Machinery Co., Mendota, Ill.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.

PLANERS
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.
Porter Mach. Co., C. O., Grand Rapids, Mich.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

PLANING MILL MACHINERY
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Chicago Machinery Exchange, Chicago, Ill.
C. Mattison Machine Works, Beloit, Wis.
Pryibil Machine Co., P., New York, N.Y.
Samuel J. Shimer & Sons, Milton, Pa.
Baxter D. Whitney & Son, Winchendon, Mass.
Black Bros. Machinery Co., Mendota, Ill.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie Co., Ltd., Toronto.

POLISHING MATERIAL
Gray & Company, H.

PULLEYS
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

RESAWS
American Woodworking Machinery Company, Rochester, N.Y.
Shurly Dietrich Co., Ltd., Galt, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

RIM AND FELLOE MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corp., Ltd., Galt, Ont.

RIP SAWING MACHINES
American Woodworking Machinery Company, Rochester, N.Y.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Canada Machinery Corp., Ltd., Galt, Ont.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

SAFETY GUARDS (For Band Saw Machines, Jointers, Rip Sawing Machines, Shapers, Swing Saws, etc.)
Chicago Machinery Exchange, Chicago, Ill.
Fair Manufacturing Company, Racine, Wis.
Jones Safety Device Co., Hamilton, Ont.

SANDERS
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
J. M. Nash, Milwaukee, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Fisher Sander Co., Berlin, Ont.
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.
Elliot Woodworker Co., Toronto.

SANDPAPER
Black Bros. Machinery Co., Mendota, Ill.

SANDERS (Moulding, Belt and Panel)
Black Bros. Machinery Co., Mendota, Ill.
Chicago Machinery Exchange, Chicago, Ill.
H. W. Petrie, Ltd., Toronto.

SASH, DOOR INTERIOR TRIM AND COLUMNS
M. Brennan & Sons, Hamilton, Ont.

SASH, DOOR AND BLIND MACHINERY
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Samuel J. Shimer & Sons, Milton, Pa.
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.

SAWS (Hand)
Shurly Dietrich Co., Ltd., Galt, Ont.
E. C. Atkins & Co., Hamilton, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

SAW MILL MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
H. W. Petrie, Limited, Toronto.

SAW SWAGES, AUTOMATIC FILERS
E. C. Atkins & Co., Hamilton, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.

SAW TABLES
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

SCRAPING MACHINES
American Woodworking Machinery Company, Rochester, N.Y.
Baxter D. Whitney & Son, Winchendon, Mass.
Chicago Machinery Exchange, Chicago, Ill.

SCROLL SAWS
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Shurly Dietrich Co., Ltd., Galt, Ont.
E. C. Atkins & Co., Hamilton, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.

SECOND HAND MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
H. W. Petrie, Limited, Toronto.

SHAPERS
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Samuel J. Shimer & Sons, Milton, Pa.
Baxter D. Whitney & Son, Winchendon, Mass.
H. W. Petrie, Limited, Toronto.

SHAVING COLLECTORS
Ormsby Company, A. B., Toronto.
Sheldons, Limited, Galt, Ont.

SINGLE SPINDLE BOXING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.

STAVE SAWING MACHINE
Baxter D. Whitney & Son, Winchendon, Mass.

STORE FIXTURES, FITTINGS
Reflector & Hardware Specialty Mfg. Co. Chicago, Ill.

SURFACERS
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.
Chicago Machinery Exchangefi, Chicago, Ill.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

SWING SAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

TABLE LEG LATHES
Berlin Machine Works, Ltd., Hamilton ,Ont.
Chicago Machinery Exchange, Chicago, Ill.
Thos. White & Sons, Paisley, Scotland.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.

TENONING MACHINES
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
H. W. Petrie, Limited, Toronto.

TOOLS (Hand)
J. A. Fay & Egan Co., Cincinnati, Ohio.
Samuel J. Shimer & Sons, Milton, Pa.

TRIMMERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

TRUCKS
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Sheldons, Limited, Galt, Ont.

TURNING MACHINES
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.
H. W. Petrie, Limited, Toronto.

UNDER-CUT SELF-FEEDING FACE PLANER
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.

GUMMERS, ETC.
E. C. Atkins & Co., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

UNIVERSAL WOODWORKER PLANER
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
W. A. Elliot, Bathurst St., Toronto, Ont.
H. W. Petrie, Limited, Toronto.

VENTILATING APPARATUS
Sheldons, Limited, Galt, Ont.

VENEER DIERS
Sheldons, Limited, Galt, Ont.

VENEER PRESSES (Hand and Power)
Hydraulic Press Mfg. Co., Mount Gilead, Ohio.
Black Bros. Machinery Co., Mendota, Ill.
William R. Perrin & Company, Toronto, Ont.

VISES (Band Saws)
Shurly Dietrich Co., Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
H. W. Petrie, Limited, Toronto.

VISES (Pattern Makers')
J. A. Fay & Egan Co., Cincinnati, Ohio.

VISES (Circular Saws)
E. C. Atkins Co., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
H. W. Petrie, Limited, Toronto.

WAGON AND CARRIAGE MACHINERY
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.

WASHERS
Booth Felt Company

WASTE, COTTON
Gray & Company, H.

WIPING MATERIAL
Gray & Company, H.

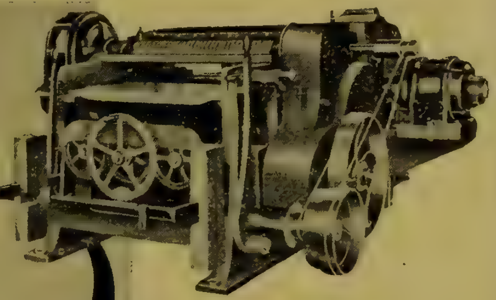
WINDOW FRAME MACHINERY
Smith & Phillips Mfg. Co., Chicago, Ill.

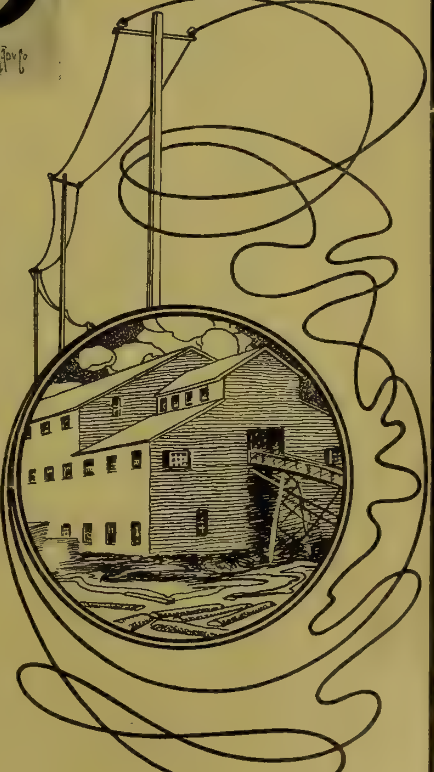
WOOD PULLEYS
Canada Machinery Agency, Montreal.

WORK BENCHES
Canada Machinery Agency, Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio

Volume Thirteen TORONTO, OCTOBER, 1913 Number Ten

Canadian Woodworker





Canadian Woodworker

Canada's Only Woodworking Paper

Published in the interests of Planing Mills, Saw Mills, Furniture and Piano Factories, Implement and Carriage Works, Boxmakers and Coopers, Carpenters and Builders.

The Circulation extends from the Atlantic to the Pacific and covers thoroughly all classes of Woodworkers in this immense territory.

Wooodworker Publishing Co., Limited

Nicholls Building Toronto, Canada

MONTREAL - - - - - - - - Board of Trade Building
NEW YORK - - - - - - - - - Tribune Building
CHICAGO - - - - - - - - - - 659 Peoples Gas Bldg.
LONDON, ENG. - - - - - - - - 3 Regent Street, S.W.

SUBSCRIPTION RATE

Canada, United States, $1.00; Great Britain, Australia, 4s. 6d.; other countries $1.50 per year. Advertising rates on request.

Vol. 14 October, 1913 No. 10

Crop Prospects Materializing

THE developments of the last month have provided justification for the optimism regarding trade conditions expressed editorially in our last issue. The situation has improved as we felt sure it would, and if September was a month of optimism October is one of certainty. The woodworking interests may lay their plans for a season of record constructional activity in 1914.

Crop prospects are materializing splendidly. A remarkable occurrence in the history of grain movement is going on in Western Canada at the present time. Never in the past has there been anything like the enormous daily stream of wheat passing through Winnipeg to the head of the lakes since the rush started a few weeks ago. On some days more than 1,700 cars of grain have been inspected at this point, more than 1,300 of which were wheat. It is quite evident that the railways are better equipped than ever before to carry the grain to the head of the lakes before the close of navigation.

One of the matters worthy of special comment in connection with the situation is the quality of the wheat, about ninety-five per cent. of it being contract grades. Reports from threshers in the country indicate that the yield per acre in most sections is better than was looked for a few weeks ago. Actual results are giving the lie to-day to pessimistic accounts of conditions that were given in some of the daily papers at the last of August and the first of September—statements which were astonishing the people generally on account of its being then apparent that they were unwarranted by the actual facts.

Even although the very heavy movement of grain at the present time has a tendency to cause easier prices, the quality is so exceptionally good that the farmers will undoubtedly get a high price for their produce this year. A prediction to this effect was made in Winnipeg a few days ago by one of the leading grain importers of London, Eng., who was visiting the Western metropolis. At the first of the week a report from the Argentine indicated that a large area in that country was suffering from drought, and, also, estimates of Russia's crops were lower than previously. These reports strengthened the market for some days.

It is being predicted by leading men in the trade that conditions in foreign countries are such that there is a good chance of wheat values holding firm in the immediate future, and it is believed that it would be unwise on the part of the western grain growers to hold back with a view to getting higher prices at the first of next year. This means more money in circulation at an early date. Of course, there is a large quantity of western grain that cannot reach the market anyway before next year. The result of the season's harvest is undoubtedly such that it will go very far towards liquidating the obligations of the country.

The Wood-Using Industries of Ontario

ONE of the most interesting government reports that we have seen for a long time is a Bulletin published under the above heading by the Forestry Branch of the Department of the Interior.

The principal contents are a detailed description of the kinds of wood used in Ontario and sections devoted to the various industries and the commodities manufactured from each kind of wood. The Bulletin shows where the material for different industries is purchased, what quantities are used annually and what they cost the manufacturer at his factory. An attempt has been made to show how waste is utilized from various industries, the object being to save some of the valuable so-called waste that is annually burned under the boilers of our woodworking establishments, or sold as kindling wood. It is pointed out that wood is used in practically every industry, and that despite the inroads made by steel, concrete, brick, and other materials, the use of wood in many cases is imperative.

The data given were furnished by some twelve hundred manufacturers, so that the report is fairly representative—even though the figures have the vagaries found in most statistical reports.

"The Habit of Efficiency"

ETERNAL vigilance is the price of efficiency. Every man must be his own watchdog, and his first duty will be to bark at himself. A lot of us would like efficiency if it did not interfere with our own ways. How angry was that officer to whom a friend reported that the improvement in his factory methods which he sought must begin by radical changes in his own behavior.

It takes a strong man to be highly efficient, because he must win a victory over himself before he can pass the threshold of the temple of efficiency. He must learn his own ignorance and then put it away. He must abandon prejudices in mind and habits in action, must throw away unbeliefs, learn to think that little which once seemed large, and that vital which was deemed unimportant. It will be clear that this ideal of efficiency is something different from merely improving a method here and there, getting a new machine, or hiring an abler superintendent. These may be done without grasping the first principles of efficiency.—Hon. W. C. Redfield, U. S. Secretary of Commerce.

The mammoth institution hasn't nearly as much advantage over the smaller plant as most people think it has, for magnitude brings its attendant costs, worries and waste.

A Well-Designed Furniture Factory at Berlin, Ont.

Messrs. Baetz Bros. & Company

IN these days of keen competition when every effort must be put forward to eliminate any waste of either time or material, the construction of a factory is a matter of great importance. Not only must the different departments in the factory be so placed as to avoid any unnecessary handling of material when passing from one department to another, but also the saving of the workman's time is to be carefully considered, and he must not have to walk further than is absolutely necessary when carrying out his work.

In the flourishing city of Berlin, Ont., which is justly celebrated for its furniture factories, Messrs. Baetz Bros. & Company have taken particular care in the construction of their factory, so that it may now be said to be run under "the law of the least labor." The

Upper end of the Machine Department, showing arrangement of the lighter machines. The Cabinet Department is at the other end of this section of the building.

factory is a one-storey building, of brick mill construction, and measures 330 feet by 66 feet. In one portion of it, however, there are two floors. This second floor occupies a space of 96 feet by 66 feet. One of the noticeable features which impresses itself upon the visitor going over this factory is the splendid lighting obtainable, large triple windows being built on all four sides.

By the careful thought which has been given to the arrangement of the different departments in this factory, the lumber, after arrival at the company's own private siding, is piled onto tracks and run upon rails directly into the drying kilns. These kilns, which contain fourteen compartments, have a capacity of about thirty thousand feet. After the drying process is completed, which may occupy a space of time anywhere from four to eight weeks, the cars are run directly into the factory, and are then put through the surfacer, which is situated immediately adjacent to the door at which they enter. The next step in the process of chair manufacturing, after the lumber has been put through the surfacer, is cutting into lengths on a swing saw, after which it is passed through a self-feed

A corner of the Staining and Shellacing Department at the Baetz Factory.

rip saw, and then to the jointer, and so on to the various processes in rotation which are common to the manufacture of chairs, cutting out, planing, band sawing, shaping, trim sawing, boring, carving and sanding and putting together. After this work has been completed the finishing commences, which consists of staining, filling, shellacing, and putting on the varnish. This may be said to complete the preliminary work, as the rubbing, polishing and upholstering are not done until the orders for shipping have been actually received by the firm.

The company are determined to be thoroughly up-to-date in the machinery they use, and they have a very large variety manufactured by the following well-known firms. Jackson & Cochrane have supplied the surfacer, swing and other saws. planers, mortisers, boring machines, chucking machines, sanders and banding machines, and also a special retort for steaming the lumber under pressure. The Berlin Machine Works have also supplied one of their celebrated jointers, a three-drum sander, and other machines. One of the latest models of the Preston Wood-Working Com-

Rear view of the factory, showing connection of Machine Department, dry kiln and lumber yard. The lumber is unloaded from cars on to the company's own siding and run direct on lumber trucks into the Dry Kiln and Machine Department.

pany's self-feeding rip saws has been lately installed. The glue is heated by a Wetmore glue heater.

The power in use throughout the factory is supplied by a Goldie & McCulloch, Wheelock, 75 h.p. engine. The heating system in use is the Webster vacuum system. The company use all the shaving and any waste material as fuel. The fuming chamber (in which the ammonia system is used) was constructed by Messrs. Baetz Bros.

It is interesting to note that the number of pieces required in the construction of an ordinary chair is from seventeen to twenty, although of course for the more fancy styles this number varies in different styles of chairs.

Messrs. Baetz Bros. & Company started business on the first of January, 1908, the partners being Jacob Baetz, Sr., Chas. J. Baetz and Jacob H. Baetz. These gentlemen purchased the plant of the Pommer Cowan Company, who manufactured a line of furniture similar to that which Messrs. Baetz Bros. are now producing. Mr. Baetz, Sr., does not now take an active part in the

A corner of the Packing Room, which adjoins the Upholstering. Rubbing and Polishing Department.

business, although he still retains his financial interest in it. Mr. Jacob H. Baetz has charge of the office and shipping department, and the practical end is taken care of by Mr. C. J. Baetz, who has had over fifteen years experience in furniture manufacturing. The company are at present employing between sixty and seventy men. They manufacture medium and high grade chairs and do their own upholstering. Their markets are principally in the east of Canada, that is, Montreal, Toronto, Ottawa, Quebec, London, etc., although at the same time about fifteen per cent. of their business is done in the Western provinces.

First Factors in the Furniture Factory

By A. T. Deinzer

WHY do some furniture manufacturers fail while others make a success in the same line of business? Again, the keen progressive competitors may be able to sell his goods for from 15 per cent. to 20 per cent. less than you. If the manufacturer, not strictly up-to-date, would attmept to market his goods at some of the prices manufacturers are receiving for furniture to-day, they would commit financial suicide. The manufacturer may now say, "I have a very efficient cost system and know positively that I cannot manufacture my goods for less money than I am now asking. Of course, I will acknowledge that we haven't enough business to keep our plant humming to its fullest capacity, however, we are satisfied to have our competitor take orders at the lower prices but what we cannot understand is that he does not fail, instead he seems to succeed, in fact is adding additions to his plant right along and employing more men all the time."

Supposing we analyze this modern manufacturer's plant and see just why he is not failing as we suppose he must. We find he has a well organized staff of office and workmen, employs the very latest machines and his methods of doing business are entirely different than were used a few years ago.

The modern furniture manufacturer has analyzed every operation of his work and has by no means overlooked the lumber yard and the so-called break out department or cutting room. It is not uncommon to find plants where the lumber cutting is crowded for space. Waste pieces all lengths, widths and thicknesses, yes, of various kinds of woods are thrown upon a mountain of waste pieces and the foreman will tell you that he is too busy to sort the stock, however, should they receive stock bills for small sized pieces a boy is instructed to sort the stock and select such pieces that might be used to advantage. How about the balance of the stock? Well, that may be worked up at some future time. In the meantime the pile is growing larger and larger all the time; finally, in order to make room, this waste is sawed up into fire wood. Have I not observed this time and again? Indeed yes. When the operator has the waste piece in his hands why not determine right then and there what is to be done with the piece.

The modern foreman or superintendent studies the actions of his workmen, the conditions surrounding their work, and all the other variables which go to help or hinder them in actual furniture manufacturing. The modern foreman pays particular attention to the motions made by a given man and by closely studying his man, discover how the number of motions can be cut down, all of which totals an immense saving of time and motions. Supposing the operator referred to knows just what to do with his waste, in other words we have a place for the various thicknesses, kinds of wood, etc., of the lumber sawed. Would we not eliminate much loss and annoyance and have an orderly break out department. It has surprised many a foreman to see how much room he really has after stock is piled up and the room is in good order. We all know that the cutting room should be large, however, no matter how large the cutting room if we do not take proper care of the waste we will soon fill up a room three times larger than necesasry. It is a good idea to work up this waste as soon as the operator gets hold of it. In our case we work up short pieces into couch legs, back boards, couch leg face plates, drop out carvings, dowels, etc. We work up our waste to good advantage and at a surprisingly low cost. If the stock is too good or the waste pieces too long to work up to advantage, we have a place for it and keep it in its place. No stock should be allowed to accumulate on the floor and round the machines. Have racks arranged near the swing saw for and pile all left over cuttings in these racks. Boys can do this work very nicely.

The lumber yard—the storage sheds and the kilns should be laid out in such a manner that the lumber is handled but once. The lumber should be loaded from the car into the trucks. These trucks, should move on a special trackage, run into the storage sheds, where the ends of the lumber may be coated with a preparation that prevents splitting and cracking.

From the storage sheds the lumber should be run into the drying and seasoning kilns on the same truck on which it was first loaded. Then into the factory for the first process in the making of furniture. Carry as much stock as you possibly can keep on hand so that you have an immense stock to draw from and this will reduce chances for cracking and warping to a minimum. There should be no back tracking, from the lumber in the car to the shipping of the finished furniture. Your goods should move steadily from process to process without a halt.

In order to successfully dry lumber it is only necessary to understand the nature of the different kinds of wood. Much trouble is experienced by manufacturers in lumber checking. Wood checks because it shrinks unequally as it dries and especially if the drying is not uniform. If your timber surface dries it is bound to check; the only remedy is to dry more slowly. The rate at which a stick dries in the air is dependent upon temperature, humidity, and circulation. Oak is one of the most difficult woods to dry without checking, and if allowed to air season it must dry very slowly.

Not enough attention is given to the sticks used in piling lumber. One will often see workmen use 7/8 in., 1 1/8 or 1 1/4 in. thicknesses. The superintendent does not care to get out suitable sticks, this he may consider a waste of time. Your sticks must be thoroughly dry.

Keep each kind of wood by itself, so far as possible as this will save lost motion in getting required material into the cutting room from the yard or shed.

When piling in the yard, it is well to have stacks

piled with plenty of room underneath. Too many users of lumber put their stock almost on the ground, and under these conditions it is almost impossible to dry the boards unless on concrete foundations, and if these are not practicable, substantial foundations of wood which will lift the pile sufficiently high above the ground to enable plenty of air to circulate and prevent the earth damps from permeating the lower sections of the pile.

We assume that your kiln is thoroughly modern. If not, it will pay you to install one of the latest dry kilns. There are several very good kilns on the market today and they are advertised quite extensively in woodworking trade journals. The writer prefers the moist-air kiln.

Victoria Concern to Utilize Mill Waste

An experiment in conservation that will be watched with interest is about to be undertaken by the Cameron Lumber Company, Victoria, B.C., which proposes to expend about $50,000 in a plant which will transform sawdust and other mill waste into marketable fuel of high quality. This has been the dream of mill owners and students of economy for years, and Cameron Brothers believe they have the solution of the problem in the method which they are about to initiate on a large scale. Both in Vancouver and Victoria residents in the vicinity of sawmills are loud in their complaints against showers of half-consumed sawdust being constantly distributed from the mill burners, even when these are of latest construction, and the aldermen of both cities are at present wrestling with the nuisance.

The building now under construction adjoining the plant of the Cameron Lumber Company will cost $10,000, while the machinery and other equipment will represent an additional $40,000. Work on its installation is to be commenced immediately by the Perfection Fuel Company, patentees of the process. The plant will be the first of its kind on the American continent. The mill waste now being destroyed in the burner, and of no commercial value at present, will be carried to the new building by a conveyor system and converted by means of compression into blocks or briquettes of convenient size. The initial capacity of the plant will be about 30 tons per day, but if the process proves the success that is confidently predicted, two additional units will be installed, raising the output to 90 tons per day. It is expected the fuel can be sold for about $5 per ton at the mill, with an additional charge of 50c to $1.00 a ton for delivery according to distance.

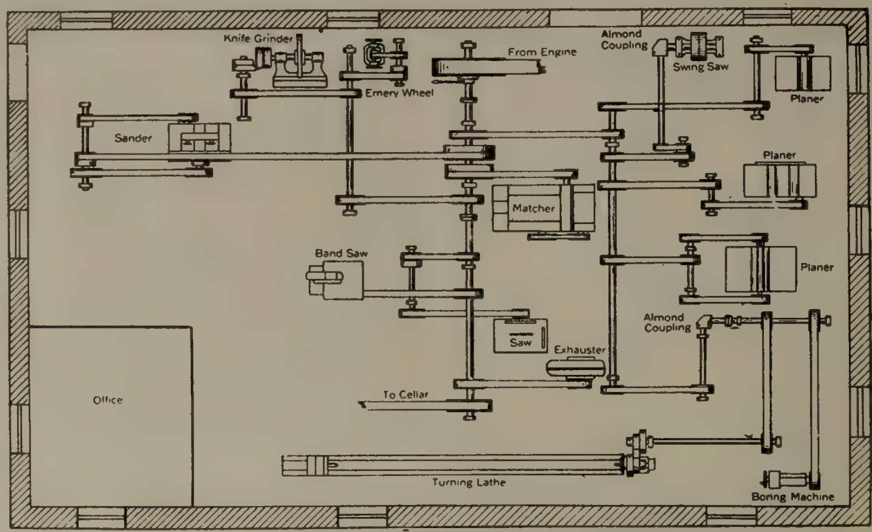
Better Facilities for the "Elmira Line"

ELMIRA, Ont., is the home of the Elmira Furniture Company, Limited, an enterprising concern which is progressing in exact proportion to the excellent opportunities for trade expansion that it is encountering in the province. The company manufacture a medium line of dining-room and parlor suites, mission rockers and chairs, den furniture, parlor and library tables, stands, etc., in quartered oak and mahogany. Their products are known to the trade as the "Elmira Line." The company have recently been making considerable

Upholstering Shop—Elmira Furniture Company's Factory

extensions to the plant. They are building a new addition—a solid brick building, 100 ft. by 50 ft., three storeys high, of mill construction. This addition, which is separated from the old plant by a fire-wall running right up through the roof, gives, with the old plant, a combined flooor space of some forty-six thousand feet. The new portion will be devoted partly to the glue room, cabinet and finishing shops. The rest of the space will be used for stock room purposes. The estimated cost of the new addition with equipment and improvements is fifteen thousand dollars. The extent of the plant and the permanent character of the company's buildings are illustrated in the accompanying cuts.

The Elmira Furniture Company's Factory at Elmira, Ont.



Plan of an Efficient Small Planing Mill.

A Small but Well-Equipped Planing Mill

THE illustration shows the location of machinery in a small but well-equipped mill, not far from my engine room, that is giving excellent satisfaction in daily operation. The building is about 35 x 90 ft., and is located directly on the corner of two very busy streets. It is composed almost wholly of brick, reinforced concrete and iron, hence is nearly fireproof; but its contents might easily take fire and injure the machinery. It would be impossible to burn the building. It is two storeys high, but one of them is below the sidewalk.

The floor on which the machinery stands is about 3 ft. above the street level, hence rough material is unloaded from wagons and the finished product is loaded about on a level surface. No description of these machines is necessary, as each one is plainly lettered.

While the first storey of this mill is below the sidewalk, it is directly on a level with a large lumber yard, hence one side and one end are practically above ground and it does not appear like a cellar or basement.

The power department is located here, and is well lighted and ventilated. It consists of a 90-h.p. gas engine and a gas producer. All the machinery shown in the illustration, also the engine and producer, is in charge of first-class planing mill mechanic and engineer. A good laborer fires the producer and does other work about the mill. The shavings are baled and sold for bedding horses, also for filling icehouses, etc. Waste wood is sawed and sold for kindling. Sawdust is put into barrels and delivered to stores, etc., to spread on the floors. The income from this source pays the expenses of preparing all material for market, also for firing the producer and caring for the engine, which is nearly as reliable as a steam engine.

Pea coal, costing about $4 per gross ton, is burned, and two tons of it lasts from eight to fourteen days, according to the load carried; the average is about ten days. The expense of operating this plant, and the result secured from the entire general arrangement and management, will compare favorably with any other mill, and is far superior to many that might be mentioned.

Planing Mill Management

By N. J. Millette

THE foreman in a woodworking plant could fittingly be termed the manager's right hand. He is the man who delivers the orders, recommendations, rules and criticisms of the manager. The men's interest in the factory's welfare will be good or bad, according to the foreman's comment (unless there be something radically wrong). If the men are not in touch with the siiuation as it exists the foreman is the one to look to for an explanation.

One word of the foreman can counteract a whole speech from the manager, and unless the foreman is loyal, faithful and true, it is unreasonable to expect a loyal disposition on the part of the men. Therefore the manager should cultivate the foreman. He should understand clearly the foreman's disposition and ability and should be able to depend on his carrying out to the extent of his power all his duties. In this way the manager will be able to stand by all his orders and comments, and if the men know that the foreman's decision will not be changed, it will cut short many discussions.

On the other hand the foreman should not take any important action unless it is in accord with the factory rules, and all his actions should be directed with these rules in view. If the men can see in the foreman's conduct, a true and faithful administration, his task will be easy in handling the men. The foreman's loyalty has so much effect upon the men that he will have little necessity to enforce his authority by speech if his actions are right. If he uses the factory's influence to

carry out a personal idea regarding some employee over whom he has lost part of his control, and then gets him turned down by the manager his authority is defeated. It is impossible to regain lost power.

Look After the Little Details

A common fault which we all possess more or less is that of neglecting minor details. A person often looks for a more responsible job, at the same time feeling the annoyance of the small details of his present occupation and neglects them. This is the greatest mistake that a man can make. He might believe that a "big job" involves fewer small things to look after, and that is where the man makes a mistake. Every job has its little details, and unless they are all attended to, and on time, they will make trouble, as a little thing deliberately overlooked will affect a man's credit more than the value of the neglected item.

If the writer could have a word of warning to address he would say, take good care of the small details of your present occupation and a better situation may come to you sooner than you will really feel prepared for it.

If the situation you are holding is not worth your entire attention and ability, drop it. Get to work where you will be able to devote all your talent and attention for your employer and be confident that it will turn sooner or later for your own benefit.

Thin-Knife Use on Hard and Softwoods

WITH the thin-knife practice having been carried on for some years, there still seems to be much need of applying some very simple principles to insure success under various conditions. In working either hard or softwood there are more things to be considered than these two characteristics, and yet little attention is paid in many cases to other forces that are directly responsible for their poor performance.

That may sound strange to many who feel that they do realize the effect of other forces; but I know of many who wilfully, and some unconsciously, ignore them.

In the case of knots, with which nearly all of us have to contend, the cutting angle, cutting circle and r.p.m. of cutter-head determine results to a large extent, but the proper temper of the knife—other things being equal—must be adopted to insure best possible results. That is also true if the stock is stringy, fuzzy, dry and brittle, or otherwise.

In any case, the proper hardness and toughness should be arrived at by experiment. Proper handling of the knife steel will result in establishing the proper degree of hardness. And that may always be adhered to by ordering knives of a known temper. High-speed steel is a peculiar metal. It requires more intelligent and careful handling than many give it.

Not over two years ago it was customary—and some still do so—to back-bevel knives in order to dress hardwood. Back-beveling, however, is not desirable, for many reasons; and yet on some styles of cylinder heads no other course could be pursued in order to get satisfactory results.

In the case of softwoods, back-beveling has long been abandoned and an angle established which has proven best for nearly all classes of woods. Even with my knives regularly beveled at 30 deg., I occasionally find it necessary to alter or slightly change them, for the reason that experiment proves it necessary in order to get the best finish.

The same is true when surfacing hardwoods. With my angle established at 15 deg.—no back bevel—I often change it to 18 or 20 deg. This usually handles oak that is still somewhat green, to the best advantage.

But let us consider the proper use of these knives from the standpoint of sharpening. Here comes a very important operation, which, fellow-tradesmen, we should consider from practically five different viewpoints.

The first is the method of grinding. This will bear mentioning in detail here, because of its importance affecting best results. Of the two methods in use for grinding these knives, each has its adherents. The older method is that of removing the knives from the head for grinding. About the only thing in its favor worth consideration is concerned with installation of a new machine, in which case it is merely the question of whether the existing method is "good enough" or whether the new method, that of grinding in the head, is worth the additional investment of a cylinder grinder.

As I have had sufficient experience that permits me to form an unbiased opinion with reference to both methods, I cannot be too emphatic in my remarks in favor of the later method.

Let us consider for a moment two similar factory or shop conditions, and look at them from the standpoint of results to be obtained.

In the case of grinding knives on an automatic grinder, where all knives must be removed from the head for sharpening, all the time consumed in removing them, clamping them into the automatic, again removing from the latter, and finally placing them in the original positions in the cutterhead, is all lost motion. Not only that, for they really need further "touching up," which must necessarily be done with the jointer, and a heavy heel is the result.

In carrying a heavy heel on the knives, they have a tendency to pound the lumber, as well as requiring considerable more power to do their work. Under such conditions, knives dull more rapidly and more frequent grinding is necessary. The ultimate result of this is short life for knives and higher knife bills.

In my experience I have realized far more satisfactory results from the little grinder that sharpens your knives right in the head. Knives last longer, stay sharp longer and give better results from the standpoint of finish. No degrading of stock ever results if properly handled.

While all that I have said may or may not be wholly agreed with by all of my readers, there is still a more serious feature to be considered—that of the tendency of the average operator to neglect the care that knives require on either hard or soft woods. That alone is often the determining point of either a small or fair margin of profit.

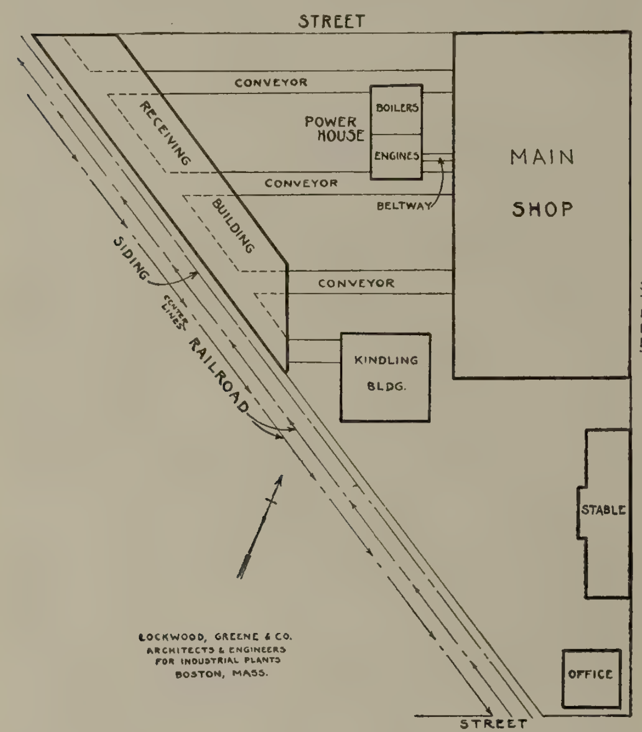
As a final word by way of suggestion, allow me to urge every reader to give more serious thought to the points I have mentioned. Don't allow yourself to be carried away by that common human weakness that causes us to be led to believe "as we should like to," rather than "as we should."—C. M. V., in The Wood-Worker.

Theory and practice are like a man and his boss in that they fail to agree now and then, and both have their good points.

An Interesting Box Factory Lay-out

THE profit to be derived from a box factory depends to a great extent upon the arrangement of the various buildings together with the means for handling the material from its raw form to the finished product and the disposal of the waste. These matters should receive the closest study of architect and engineers before any arrangement is adopted.

An example, of what can be done in the way of an efficient plant arrangement for a box factory where the space was of irregular shape and limited, is afforded by the layout of the box factory shown in the accompanying sketch. Here the owners had to make use of a triangular piece of property, bordered on two sides by streets, with the long side running along the railroad. The plan drawn up by the engineers Lockwood, Greene & Company, Boston, Mass., and adopted by the company in question, consisted in erecting brick and timber buildings, the receiving building being located adjacent to the railroad with the three conveyors leading from it to the main shop.



Interesting lay-out of a Box Factory.

The arrangement has effected the simplest movement of material from the receiving building on the railroad line through the main shop and out to teams which make the major portion of delivery. The raw material is transported from the receiving buildings to the main shop by three roller type conveyors which deliver the material directly into the feed rolls of the heavy planers located on the top floor of the main mill.

The cut-off machines, feeders, trimmers, and matchers all produce a considerable amount of sawdust as well as end clippings. Under each machine is a hopper through which this waste material is delivered to a conveyor located overhead on the storey below. These conveyors deliver to a common conveyor running at right angles. This latter feeds a hopper provided with a screen of such mesh that the sawdust drops through, while the end clippings pass over the screen and on to another conveyor which runs outside of the main building and delivers the end clippings into the upper part of the shaving bin in the boiler house. This material is then shovelled by hand from the bottom of the bin hopper into the boiler for fuel.

For handling the sawdust there is a blower system by which the material is carried to the roof of the main building where it is delivered into a bin.

For collecting the shavings there is a second blower system independent of the sawdust system. There are connections from the heavy planers to the fan whence two pipes lead to the shavings bin on the top floor of the kindling building and to a collector on the top of the boiler house respectively. From the latter five discharge pipes lead, one to the shavings bin already mentioned, and one to each of the four boilers. At the point where the delivery pipe from the fan branches so as to go to either the boiler house or the shaving bin, a switch and percentage valve are located. This is to permit the boiler tender to keep an even air pressure on the fire beneath his boilers. The switch is connected up for operation directly from the boiler room floor.

A fourth system is in use for handling kindling wood. Strips are collected from the trimmers in boxes and wheeled to the kindling saws which are located near the end of the main mill opposite the kindling building. These saws cut the wood into proper lengths for kindling, the pieces dropping into hoppers under the machines and then onto an inclined conveyor which delivers to a horizontal conveyor located overhead in the first storey. The latter drops onto a belt conveyor which delivers the kindling into a large bin at the top of the kindling wood building. This bin is of sufficient height so that carts may be driven in on the lower floor and be filled directly from the bin above.

As the power in this plant is entirely mechanical, all these conveyors and fans are operated by belts from the various line shafts. Wherever conveyors traverse open spaces between the buildings they are carefully housed in against the weather. The entire conveying system is so arranged that it will be a matter of little difficulty to add one-third to the equipment when the final six sets are installed in the main factory.

Former Waste Product Now Employed Extensively

Not so very long ago about the only real use anyone had for sawdust was for packing ice. That was when small local sawmills were more common, and the amount of this form of waste wood was, or at any rate appeared, comparatively small. Now, when the tendency is to consolidate these into large mills with a capacity of several hundred thousand feet of lumber per day, the daily waste in sawdust is seen to be enormous and much experimenting is being done to discover new methods of utilizing it.

Perhaps the most promising venture in sawdust utilization in this country is the manufacture of ethyl (or grain) alcohol. The sawdust is treated with sulphuric acid under suitable conditions, resulting in the formation of sugar, which is then fermented to produce alcohol. Several plants have been erected to produce alcohol from wood in this manner, and, though there are some difficulties still to be overcome, the ultimate success of the process on a commercial scale is assured.

Sawdust has been successfully manufactured into briquets for fuel for a considerable time in Europe

are first steam-dried, the water contained in the wood being thus evaporated and the resin almost liquified. by a very simple process. The shavings and sawdust The sawdust is then compressed under heat into briquets of the desired size, the contained resin acting as a binder. A firm in Vancouver is engaged in a similar line of manufacture, the sawdust being compressed into a cylindrical tube where it is cut into short lengths by a revolving knife, emerging in the form of small round briquets. These briquets are clean to handle, easy to kindle, and leave very little ash.

In England sugar is manufactured on a commercial scale by treating sawdust in closed retorts with weak sulphurous acid under high pressure. In Austin, Texas, also a plant is being built to manufacture stock food from sawdust, by a somewhat similar process. The tar, pitch and turpentine are removed from the sawdust leaving only sugar and fibre to which is added forty per cent of cottonseed meal. The mixture is sold for fattening cattle.

Two and one-half parts of clean sawdust mixed with two parts sand and one part cement make a warm long-wearing and sound-proof floor, to which carpets can be tacked with less injury than to a board floor, and which has the advantage over a cement floor in being more elastic. These qualities should win an extensive use for this form of flooring, which has the additional advantage that it can be stained to harmonize with interior finishings by the addition of color to the mixture while in a semi-liquid state.

The sawdust of certain kinds of wood is used in considerable quantities by manufacturers for metal polish, for packing, for meat curing, for making safety explosives, composition novelties, and for fibre and pulp manufacture. Patent cleaning powders for use on carpets and rugs consist principally of sawdust. lightly moistened by some cheap mineral oil.

Problems of the Glue Room

GLUE is glue and wood is wood, and if one glue will cement wood together, why won't all makes of glue do the same? And if any glue will hold one variety of wood, why won't it hold all varieties?" Thus spoke the manager of a furniture factory recently to his veneer man, who protested against a certain glue which the former was about to order for a certain class of work.

The inability of many men to give an intelligent answer to the above question is responsible for much of the trouble experienced in the glue room, and this lack of knowledge may usually be divided between the office and the glue room—between the man who buys and the man who uses the glue.

"Glue is glue," says the man who buys. But what is glue? The dictionary says it is a tenacious, viscid cement, made by boiling some animal substance to a jelly. But all animal substances that are boiled to a jelly are not cement, and while all cements may have a certain amount of the cohesive quality, this quality is not tenacious in all of them, because tenacious means to hold fast, and some cements do not hold fast. Men are, therefore, deceived by names, but names do not alter things. The jelly-like animal substance placed upon the market is not glue merely because it is called such.

"Wood is wood," says the man who uses the glue, and he puts the same mixture on beech, oak and basswood, and when the results are not uniform he is about as badly puzzled as the man who could not understand the conundrum: Beech, birch and basswood—"all" begins with A. Here, as elsewhere, names do not alter things, and while wood is wood, the name does not alter the nature of the different species.

The same glue mixture that would make an unbreakable joint between two pieces of maple, would hold but a short time if used between two pieces of basswood. And why? Because the more absorbing nature of the latter wood would drink up all the glue and leave an insufficient quantity on the surface to make a permanent joint by firmly uniting the two. A similar result is obtained if the conditions are reversed, but in a somewhat lesser degree. Glue that will make a perfect joint between two pieces of basswood is too heavy for harder and more close-grained woods like maple, birch, etc.

There are two reasons why this is so. In the first place, there is the danger that the surplus glue, when used too thick, might not be squeezed from between the two pieces. Too much glue is about as bad as not enough. Then, glue that is heavy has not the same chance to take hold of the hard, close surface of such wood as maple that a thinner glue would have.

Occasionally a man finds himself face to face with the problem of joining together two pieces of wood, one of which is hard and the other soft. Veneer men are frequently given soft whitewood cross-banding to use on maple or birch core stock. The question arises: What sort of glue mixture should be used on this combination? In a case of this kind it is possible to compromise the matter by preparing both the glue and wood to meet, to a considerable extent, the requirements of the other. When a hard and soft piece of wood are to be joined it will not be necessary to make the glue as heavy as would be required were the two parts soft, because the hardwood would not be able to take up its proper share of the glue; neither will it be wise to make the glue as thin as would be best adapted for the hardwood alone, because the softwood would then absorb more than its proper share, and not leave a sufficient quantity between the two woods to make a perfect union.

In preparing the glue, a little less liquid than is usually used for hardwood alone, and a little more than is required for all softwoods, will be a step toward meeting the requirements of the wood. But in the preparation it is important that we keep in mind the demands of the softer wood more particularly, because the harder wood may be made to conform somewhat to the requirements of the glue, by running the hardwood stock through the sander, using No. 1½ paper. This creates an ideal surface on which to glue, and one on which a good glue solution will hold forever.—The Wood-Worker.

A writer in Factory makes a statement that: "Although wood-working is the oldest of the mechanic arts, it is a remarkable fact that comparatively little thought has been given to the scientific and systematic grinding and care of machine knives and saws." Evidently this man is not familiar with some of our modern saw mills and wood-working factories and the equipment that enters therein, or he would not feel justified in making such a statement, says The Wood-Worker. The wood-working fraternity has made wonderful progress in this line, and is just about as nearly up to the minute in efficiency and thoroughness as any industry in the country.

Making a Wooden Cone Pulley

If one desires to construct a cheap cone pulley, let him take a board of 2-in. dressed stuff, and on this, with a compass, mark out the different sized circles he needs. After sawing these out with the band saw, let him glue and nail one piece upon the other, making one solid chunk. Through the center of this let a hole be bored just large enough to allow the spindle to be driven in tightly. Placed in the lathe on this spindle, the whole thing may be finished off in a jiffy, to the required dimensions, without further ado, actually ready for immediate use.

But this hastily-put-together product, after all, is a poor excuse for a real cone pulley. Built of solid blocks, these will be more or less subject to shrinkage, while the chances are that one or more will split in course of time. There is really nothing to prevent these undesirable results in a pulley thus shabbily and hurriedly thrown together. Every once in a while it will need retouching to avoid a wobbling motion of the belt or uneven running of the machine, two extremely objectionable features in any kind of a pulley.

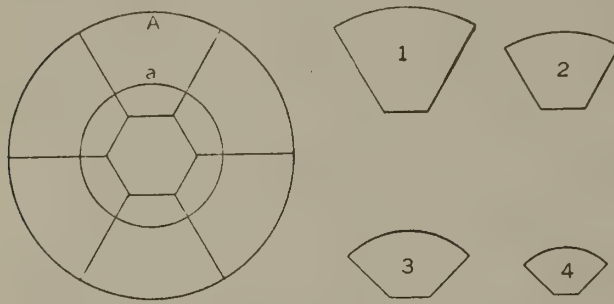


Fig. 1—Construction of Pulley.

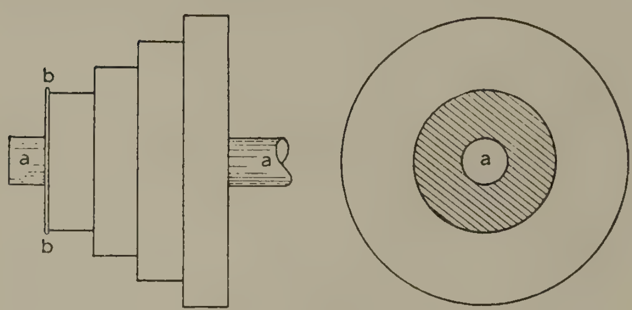


Fig. 2—The Finished Pulley.

Now, to build a real strong, serviceable cone pulley, such as will last a lifetime, if need be, an entirely different plan from the foregoing must be adopted. In this instance, the pulley will need to be built up gradually, on a regular raceplate, and of thin material. In fact, each step should consist of no less than three separate layers of segments, each course, in turn, being firmly glued and nailed onto the other.

To be sure, this work is slow, tedious and runs away with considerable time, but when the result will more than repay all extra trouble. An article will be produced at once solid and unshrinkable, destined to stand the wear and tear of many years of hard usage.

Fig. 1 will help to give the reader a clear idea of the work of construction, showing, as it does, the largest sized step in the pulley. As will be seen, this consists of six segments, ¾-in. in thickness in this case, and each corresponding in size to 1. Of these segments, there are three courses in each step. In the same way also are built the smaller steps, consisting of segments tallying with 2, 3 and 4, only in the case of 3 and 4 the number of segments is four instead of six. Each one is fitted snugly to its place and fastened on with glue and nails. Thus the process continues until the whole structure is completed.

Of course, at this stage of the work the pulley still remains in a rough, unfinished condition, and needs smoothing off and turning down to its proper size and shape. In order to do this, a recess 3/16 in. deep is turned in the surface of A, as shown by circle a. In this a thin brass plate is inserted, flush with the face, and firmly screwed to the wood. In the center of this plate, as indicated in Fig. 2, a, a hole 1½ in. in diameter is bored for the insertion of a spindle.

On the small side of the pulley, Fig. 2, b b, another thin brass plate is screwed on, with this difference, however, that in this latter case the recess of ⅛-in. is in the plate to allow it to slip over the small end. This also is screwed on, and contains a center hole corresponding in size to the one in the other plate. The next step, of course, is to drive in the spindle, care being taken to fasten the pulley firmly upon it at the point desired. With all these details attended to, the whole thing can then be placed in the lathe to undergo the finishing touches, a matter that need consume only an hour or two.

When the turning is done it is always advisable to give the whole surface at least two coats of shellac varnish, both for the sake of improving its appearance and protecting it from the harmful effect of the atmosphere.

As to the kind of material advisable to use in a job of this description, it may be said that ordinary pine will answer very well, in case one can afford nothing better. But if a person desires an article that will stand the wear and tear of long years of service, and give him no trouble to keep in good order, he should by all means use mahogany, because there seems to be no wearing out of this wood.

I know of a mahogany cone pulley that has been in constant use on a lathe for a period of over forty years, and is so well preserved to-day that it looks as if in condition to last that of time again, if not longer. It is just as strong and runs just as true to-day as when first placed on the machine. It has never given the owner a bit of trouble. So, for a strong, lasting, serviceable cone pulley, there is no material comparable to mahogany.

Fig. 2 is designed mainly to show the finished article, with the brass plates and spindle inserted in their respective places.—The Woodworker, Indianapolis.

Sanding Core Stock

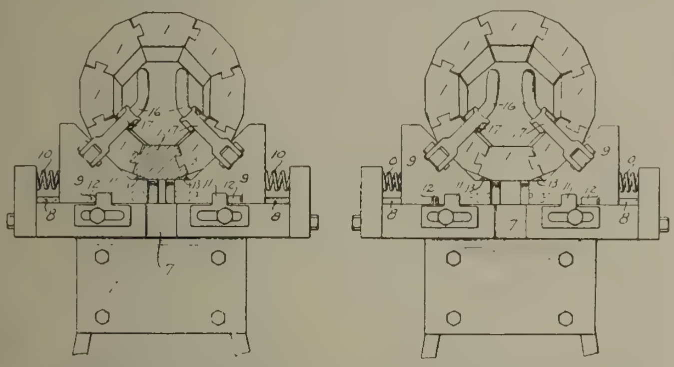
Where one expects to do a really nice job of fine face veneering on top of a core body, the usual practice is to cross-band the core body and then sand over the cross-banding before applying the face veneer. Occasionally one hears a complaint that this sanding leaves a fine dust in the wood and that the glue will not adhere to it as well as it should. This is a case of using wrong sanding or not properly cleaning the finished work. To sand core stock right, one should not simply send it through the regulation triple-drum sander with the same paper and adjustment used for finishing off face work. A single drum sander will serve to work core stock of this kind. Or if it is taken to the regular triple drum sander, drop the two back drums out of the way and simply use the front drum. Cover it with rather coarse paper, say No. 2 or 2½, then set your

brush roll up to do good work in cleaning it off, and you will have a finish on your core stock that will take glue and hold its face veneer well. The idea in using the coarse paper on a single drum is to give a tooth-planed effect to the face of the core body when smoothing it off. This will make it take and hold glue well, whereas if all three of the drums are used with finer paper on the back, it tends to make the face somewhat slick and to inbed in it fine particles of dust which are difficult to clean out. Coarse paper on one drum will not only give better results, but it takes less power to do the work and is also economical in sand paper.

New Method of Manufacturing Colonial Columns

READERS of the Canadian Woodworker will doubtless find a point of interest in a new method of manufacturing fir colonial columns evolved by a Tacoma firm.

The colonial column business is already one of large proportions and a promising one, but the market has



Final stages in the building of dovetailed colonial column. The figure to the left shows the inserting of the small end of the last shave. The figure to the right shows the column after this stave has been shoved into place.

been somewhat impaired owing to the fact that the ordinary tongue and grove glued joint column will sometimes come apart when subjected to the weather or other especially trying conditions. This has been the biggest source of trouble and worry to manufacturers and dealers. Much thought has been given to overcome the difficulty and many methods have been tried with varying success. One of the most successful of these methods was to cleat the staves together on the inside of the column. The greatest objection to this method was its high cost.

The Tacoma firm has solved the problem to its own satisfaction by producing a dovetailed column, so manufactured that it cannot possibly come apart at the joints. In addition to the dovetailing feature, the column posseses another qualification which the company term "peripheral compression." By this is meant that the outside circumference of the column is always under a strain which compresses the outside of the joint thus making an open joint in the exterior or exposed surface of the column impossible. The peripheral compression is accomplished in the following manner:

The column is built up, that is, one stave after another engages with the adjacent stave until the circle is complete. In this manner the column has to be built up so that the narrow end of the last stave enters the space at the butt or large end of the column, as shown in one of the accompanying sketches. As this last tapered stave advances it causes the two staves which it engages to separate, thus increasing the diameter of the column slightly and putting each point in the column under peripheral compression.

The machine does a large amount of work which is done by hand where the columns are made by the old method of manufacturing. The blank stave stock, cut to the proper length, is piled into a hopper at the front of the machine. The stock automatically passes through two sets of cutterheads which cut the dovetails, bevel the staves and taper them, all at one operation. The stock passes right along to the gluing mechanism which is a part of the machine. The glue is spread by machinery, thus insuring hot, constant grade glue. Meanwhile the staves are advancing toward the assembling table. Here the staves are automatically put together, entering the proper grooves with a precision which is more than human. The completed columns are taken from the machine and after the glue has thoroughly hardened are placed on the turning lathe, where they are turned to shape and sanded to a shiny finish. The firm is still making columns by the old method in addition to the new or dovetailed process. The company, however, finds the latter much more satisfactory and is arranging ultimately to produce nothing but the dovetailed type. The company believes that the dovetailed columns are absolutely dependable and that they will do away with the troubles which develop occasionally with the old type tongue and groove columns.

It goes without saying that one reason for the popularity of these fir columns is the fact that the very best soft yellow fir, generally door stock rippings, is used in their manufacture. This means that the lumber in the columns is unusually thick, thus insuring strength and durability.

Refinishing a Patchy Varnished Surface

In refinishing a piece of varnish work that is patchy it is first necessary to get at the actual trouble. It may be caused from imperfectly prepared groundwork, an admixture of raw linseed oil to varnish, or incompetent brush work. First smooth down with pumice stone and water; prepare with a mixture of equal parts varnish and turpentine, and revarnish. Use no adulteration in varnish. Lay on a good full coat of varnish freely and quickly, afterwards working this again once or twice all over without recharging the brush, taking off again some of the varnish thereby, occasionally rubbing this out on another part of the work.

When a man knows he is going to need a new machine before a great while, he should take time by the forelock and investigate thoroughly all the different makes and offerings in this line, that he may be prepared to choose intelligently that which suits his notions and needs best. If he waits till the last minute, when a sudden breakdown makes it incumbent to buy a new machine at once, he may buy in haste and repent at leisure.

Soaking old brushes in benzine or gasoline gives poor results, but the brushes can be restored to prime condition by soaking them first in one of the patent paint removers for a few hours until the hard paint becomes softened, then taking off all the surface paint with a putty knife and washing with soap and warm water. It will not hurt the bristles, and all the paint will come out both inside and out.

The Furniture of Our Forefathers

How it Embodies the History and Romance of its Period— The Influence of Chippendale, Hepplewhite and Sheraton

IT is through its power to exhale the past and the quickening touch it lays on memory, recalling a sentiment here, a tragedy there, that the furniture used by our early settlers commands our interest, often our affection. In the severity of its lines and its sparseness we get even a strong hint of the rigid lives of those ancestors who, grappling with hard winters, still worked steadfastly on toward the building up of the land in which today we find comfort and ease of living.

This furniture made, moreover, a gentle insistence to be understood, the gentleness being of the sort embodied in the Arab's proverb which intimates that with this virtue one can lead an elephant by a thread. In it was also to be traced a glint of man's interpretation of nature, the forest furnishing many types for tables, chairs and couch. The beauty of nature was everywhere conceded and the wish to interpret her felt strongly long before the cry was given for bodily comfort. Men were satisfied with hard surfaces, making chair seats of unyielding wood with backs straight and uncompromising even while the need was recognized to embellish them with high relief carvings of foliage and foliated scrolls, with wood nymphs and the heads of beasts that roamed the forest fastnesses. The furniture of the Italian Renaissance showed also this desire to interpret the grace of nature; and it was ever to Italy that cabinet-makers reverted when their wells of inspiration ran dry.

The ships bringing the Colonists brought also their furniture, yet in more limited quantities than is thought by many today. Chests, serving as both storehouses and resting places; chairs in considerable numbers, simple examples of Queen Anne and Jacobean styles, a few tables and a bed with warm coverlets made up the most luxurious of inventories.

History of the "Four-Poster"

As in the mother country, the customs of which were dear to the hearts of Colonists, the idea of comfort in furniture rested almost exclusively in the bed. This was natural for the four-post beds, the most important early piece of furniture that came from Italy and represented the need of a people using their great hall spaces as general living rooms for family, friends and soldiers—the need likewise of a people ever on the alert to defend their castles or their homes against an enemy. These four-post beds with their heavy hangings gave, for one thing, and mercifully, privacy, the day being one wherein its measure was scant; they gave, besides, warmth in halls of barren grandeur, of stone or marble bleakness. When the limb-wearing labor of the day was over these rugged people found in such beds, and in them alone, physical comfort.

In fact, luxurious to a degree were these four-post beds of long ago. Yet those early used in this country were without the box springs and long-hair mattresses thought necessary today to insure repose of the body. Instead, springs of rough rope were constructed to form a support for mattresses made either of corn husks, on top of which was placed one, perhaps two, of feathers. The posts of these beds that were slight and tapering, sometimes fluted, were the first ones to reach the shores of the New World. It was not until the time of Napoleon when Empire influence had traveled far that they as well as head and foot pieces were heavily carved with twists, flowers and fruits and especially with the beloved pine-apple.

Many still point with pride to four-post beds that have descended to them from revered ancestors, and reproductions of them are also bought by those admiring the personality of this furniture used in earlier days. A few there are, however, since men are of many minds, who question the right of the four-post bed to live, now that its direct purpose is no longer extant. The premium on privacy is no more; it can be secured in the different rooms and ante-rooms of almost any house; there is no longer need to get behind the curtains and under the covers of a four-post bed in order to secure bodily warmth. Since then the real purpose of such beds has been outlived, their heavy upholstering is thought to be comewhat injurious to health and general welfare, hangings being able to harbor much dust besides germs in dreaded multitudes. At present when the world lives in apartments and houses none too large to accommodate the family, the bed has lost to a certain degree its high place of importance. People have little hesitancy about entering a room in which a bed is conspicuous, while a room wherein its place is taken by a couch, can be used for more general purposes. The formality of a bed room, whether for good, or for ill, is, therefore, in many homes losing its prestige and becoming a place for more democratic treatment. Not but what those possessing ancestral beds and a fitting place to set them up will continue to enjoy rightfully the glamor of romance which they exhale and to honor the personal link which they represent between the past and the present.

Jacobean Style the Earliest in America

As is well known, the style of the first furniture that came to the American colonies was Jacobean, and it was the first imitated by the early cabinet-makers of the country. It came directly from England, the land from which the Italian influence had in part departed, in part become native, the craftsmen under these conditions letting loose their own individualism. In England at this time architecture was grandiose, a characteristic strongly reflected in the Jacobean style and in its sumptuous use of oak.

The Jacobean chair is one of the early pieces that came to this country, a frank and honest-looking chair, vigorous and uncompromising. Its turning is free and gracefully done by hand, a fact which gave to much of the old furniture an appearance less harsh, a bit more chic than that noted today about the quantities of household goods turned out by machinery. More elaborate Jacobean chairs display the frame-work of the cane backs heavily carved and elaborated. All in all they were very impressive.

Oddly enough the Jacobean style of furniture is of all others the most sought after and patronized by fashion today. Garrets are ransacked for chests, square cupboards, gate-leg tables and boxlike pieces of furniture, long unused and hidden away in dusty lofts,

while other styles have had their day and passed from favor. This return to popularity of the Jacobean conceptions may be because representative Americans are living more in the country than a decade ago and because their houses are very spacious. Country halls are usually large, often well suited to the furniture of this period. Dining rooms also take the Jacobean styles remarkably well, since it is invariably imposing and free from all appearance of triviality.

The Queen Anne Windsor chair is one well known to the early Colonists. Its beauty is that of simplicity and good construction. It is a chair to forbid lounging as known today, but one which nevertheless has a gracious curve following the outlines of the back, arms to lean against and a support offering rest for the head and shoulders. Early American cabinetmakers took some points from such chairs when they made the now celebrated comb-back rockers, purely an invention of the New World. Perhaps it expressed also a longing for more ease of body than had hitherto been regarded as in conformity with spiritual piety. Certainly its acceptance was immediate.

Chippendale Creations

Chippendale having sipped to his full of the beauty of the Louis XV. design, gave his name to various styles and forms that followed the Queen Anne, but the early examples of his work that came to this country were simple in the extreme. And this was to be expected, since it was brought here to go into rooms of rigid simplicity; rooms in which the occupants were stiffening their backs to resist the oncoming Stamp Act. In the mother country, on the contrary, where a certain moral laxity was gripping the people, much more elaborate pieces of furniture by Chippendale were in vogue. Indeed, this man and his work became the cry of the hour and shed an influence felt even today, for he was an originator so individual that even though without conscience in adapting to his needs the Louis XV, the Gothic, the Chinese and the Dutch, his particular work still shows his own strong points of personality. The plainest of his chairs are different from those of Queen Anne because he widened them across the top, giving them the dignity of an individual with broad shoulders and a slim waist; the gradual taper of the back legs continued to the ground while those of the front were either straight or cabriole, the latter resembling the legs of many Queen Anne chairs or else following more or less the French lines. Still pieces of Chippendale that show the French influence came hardly at all to this country in its youth, much less frequently than those of mahogany which had previously been adapted to English taste. Today the former are brought here as rarities having cost an abundance of coin such as could never have entered even the wildest dreams of the clever Chippendale.

The ladder-back Chippendale chairs represent an expression of this man's work that has proved, owing to its pure, classic lines, as enduring as the more elaborate pieces made for European wealth and fashion. Three-footed tip tables, tall bookcases, bureaulike desks, all came as his work to America and were used by the people of the eighteenth century; but no sideboard was ever made by Chippendale, a blow to those who believe that they posses such a thing among their heirlooms.

Hepplewhite and Sheraton

Hepplewhite and Sheraton, the other two makers whose names are indelibly associated with the furniture that gave a chaste dignity to Colonial houses were separated from Chippendale by the Adams family, who going to Pompeii for inspiration became in a way more associated with decoration and architecture than with the actual designing of furniture. Their influence is at present strongly felt in many American homes, more so than in those of the eighteenth century. But Hepplewhite and Sheraton working at the same time drank their inspiration from the Louis XVI. styles, losing thereby many of the curves and elaborations that marked the work of Chippendale. Indeed, theirs were styles altogether suitable for the hour in America when the War of the Revolution had been declared and a straightness and severity reigned in men's hearts.

The shield-back chairs are examples of one of Hepplewhite's most famous designs. Sheraton also made chairs with backs in the shape of shields, but his had always inserted across the back an angle and did not show the continuous curved line that marks those of Hepplewhite. The cabriole leg was no more; it was deserted by fashion. Hepplewhite, broadly speaking, preferred a square shaft tapering to the floor; Sheraton was more partial to the turned leg. Still the styles of these makers interblend greatly, the influence of one being shown in the work of the other. To Hepplewhite is due the development of the sideboard; Sheraton, his rival, made such pieces also, the styles of both having four legs across the front, but being at variance with each other in the curved outlines of their fronts.

Sheraton, whose style was perhaps the most refined and sensitive of any maker of the latter half of the eighteenth century contributed also his share to the distinctiveness of American homes.

It was Sheraton who conceived the well-known style of desks called kidney-shaped and nothing delighted him more than to let free his fancy in some elegant bit of furniture for the use of her whom Balzac might perchance have stigmatized as the "perfect lady." Secret drawers and panels, leaves to spring out or to turn up unexpectedly, gave veritable pleasure to the inventive mind of Sheraton. About the pieces of his furniture that have been preserved in American homes there is an exquisiteness of craftsmanship due to the touch of the human hand, besides an aroma of romance bred probably in the mind of this maker. Without doubt his furniture seems far removed from that of modern manufacturers. The rooms in which it was placed were cold and formal in appearance. Wealth had not sufficiently descended on the people of this country to permit them, as in England, to give color and variety to their surroundings by silks of bright colors and by paintings done as panels by the brush of Angelica Kauffmann.

With the influx of the Empire style into England it was to be expected that it would cross the ocean and take a strong hold on the makers of American furniture. Even Sheraton, whose poverty increased as he grew old and who typifies one of the great men honored by fame only after death, was compelled to pamper the popular demand for this new style and to make furniture sometimes called today Sheraton-Empire. Also much of that which is now called Colonial is in reality the Empire as it occurred in America,—its entrance being effected some twenty-five or thirty years after the Colonies had become States.

A locomotive company in the United States had made a success of manufacturing locomotives, and

when the automobile made its advent the company, after due deliberation, decided to undertake their manufacture. There were two things the company proceeded to do—first, to make a good car, and second, to show people that it was a good car. They did not purpose, however, to waste any money in unnecessary advertising, as they considered that a good car would sell itself. They made a car which was very prominent in races a few years ago, but somehow the car did not sell and now the company has decided to drop the manufacture of automobiles. But its venture cost it just $7,000,000. These are days of advertising, and it pays to advertise, if it is wisely done, and if we have something worth advertising.

Hints on Buying Furniture Lumber

LUMBER is the most important of the raw materials entering into the manufacture of furniture. When the purchasing department of a furniture factory tackles the item of lumber there is an entirely different proposition involved from that of the purchase of other materials. Lumber can not be analyzed and tested chemically as can glue, varnishes, oils, and then with a certain fixed standard of samples bids be invited and purchases made accordingly from the lowest bidder under these specifications. It is physical analyses rather than chemical analyses that enter more into the grading and specifications of lumber, and it is because of this fact that the purchasing agent of the furniture factory may get stung when he thinks he is getting a bargain by buying lumber at the lowest price offered within certain grades or specifications.

The bargain habit has just as strong a grip on the purchasing department of a furniture factory as it has on any one else, and even the furniture houses themselves who decry price cutting and bargain buying seek for bargains just as diligently through their purchasing department as they talk against them through their sales department. They get left, too, just about as often as the retail merchant who goes out in the furniture world to buy bargains in furniture. They get left because their desire to save a dollar in first cost often blinds them to other advantages that might be worth more than the dollar. There are bargains to be had in lumber now and then and the furniture men get some of them. When they do, however, it is the result of luck or accident or because the lumber buyer knows his business so thoroughly that he actually knows a bargain when he sees it.

For a purchasing agent to send out a large number of inquiries for lumber of specific grade and thickness to various mills and wholesalers, then sort these out and accept the lowest quotations in the lot, is really no way to get a bargain. The low bidder may not be equipped to make deliveries and the inconvenience from this may easily amount to more than the gain in price as compared with quotations of some lumberman who has the facilities and can make deliveries on time.

This is only one feature of the matter. Another is that the purchasing agent who is not thoroughly familiar with lumber may get caught, because of the fact that lumber from different mills may vary considerably, even within the same specifications as to grade. It is a fact that lumber may vary from one to five dollars in value inside of a given grade, because of the variations between grades. Another factor is the nature of the defects in any of the lower grades of lumber. They may seriously affect its cutting into the particular forms wanted. Standard defects of various kinds appear in lumber in various forms and locations, and the lumber from one mill or one locality may differ considerably from that of another in the nature and distribution of the defects.

Let us suppose, for example, one is buying No. 2 common in plain oak. Here we have a product that may vary in texture, color, defects, and in many other ways and still pass muster in this grade. It may even be bought under one of the recognized grading rules, inspected by an authorized inspector, and the inspection certified, and yet there will be quite a difference in the value of the lumber when it comes to working it up into a particular kind of furniture.

It follows that instead of putting in a lot of time compiling lists of lumbermen, getting quotations, and studying the market, the lumber purchaser for the furniture factory should make a study of lumber as it is used in his cutting department. He should know what sizes most of it is worked into, and what form of defects causes most trouble and loss. If he will study this carefully, he will find there are more important things for consideration than finding the mill or the dealer that will promise to furnish lumber of a given grade at a dollar or two lower price than the general market quotations. He will realize that the most important thing is to find a source of supply that can be depended on for the kind of lumber that works best into his stock.

The best way to find a bargain in furniture is not to hunt it directly through the price list, but to seek it by way of finding the lumber that fits the needs best. Several well-known and dependable concerns may quote the same price on a given grade and kind. The chance for a bargain here is not through efforts to beat one down in price by playing one against the other, but it is through making a study of their product to see which will work up best. If you can find one of these that will give you from one to five dollars more material per thousand, that is the material to buy and the effect will be the same as if you actually reduced the purchase price that amount.

The really shrewd buyer of broad parts is not given to playing one quotation against another so much as he is given to matching his knowledge of values and of material against the possible ignorance of some one offering to supply it. There are millmen ignorant of the actual value of their lumber. It is so well known that it has been complained of time and time again at lumber conventions. Usually it is the small millman who is made the goat in this matter and is blamed for selling his lumber at less than its actual value. This is the man whom the shrewd furniture factory buyer may single out now and then as his victim. It is a scheme that can be worked, too, provided the furniture buyer is well posted in lumber and not only sets forth his specifications but sends a competent inspector to the mill so that he knows positively that he is going to get what he wants. The buyers of wagon and implement stock have often followed this plan and found it to work very nicely. The only time it works, though, and the only way it may be worked successfully is when the buyer really knows his business and when the in-

stitution is equipped with inspectors to send out and take up the stock at the mills.

To buy lumber of a given grade from smaller mills because the smaller millman may not know the full value of his stock is no certain way to get a bargain unless there is both inspection and a certain amount of supervision over the manufacturing. The timber may be of the kind and quality desired but the manufacturing may be so poorly done as seriously to impair the value of the stock. If a saw cuts rough it makes heavy dressing to get a smooth surface, and this may reduce the thickness too much. If the saw does not stand up to its work well and runs snaky, there will be thin and thick places in the lumber which impair its value. There are many imperfections of manufacture, found in the output of those millmen who are ignorant of the real values of lumber, that often amount to more than is gained in the way of bargain prices through purchasing from them.

Let us turn aside for a moment to a different phase of this lumber buying business, by taking up the matter of the varying grades and their relative values to the furniture man. Grades in lumber like grades in glue, varnish, iron, coal and other things, naturally result in different prices or values and these in turn fluctuate from time to time in their relation to each other, yet in the long run they are fairly even.

Coal people, for example, figure heat unit values of different grades and kinds of coal, and from this and other factors entering they make the selling price, so that it matters but little what grade one buys—the ultimate cost is practically the same to secure a given amount of heat.

It is partly that way in the lumber business. The upper grades carry higher prices, but in cutting up they produce more good stock, so when price, freight, handling and all other things are considered, there is not as much difference between the ultimate cost of the upper grades worked into furniture and the lower grades.

There is a disposition to turn to lower grades when the price of lumber runs high. A striking example of this occurred during the past year. Because of higher prices in the lumber market the demand for grades below No. 1 common became so strong that low-grade lumber was the scarcest item on the market, in face of the fact that a greater percentage of low-grade stock is made now than ever before.

The question that comes out of all this is, how can a lumber buyer know when it is cheaper to buy low grades or upper grades or what particular grade would be the best bargain in lumber at a given time? The only way he can know positively is by keeping a careful record of the results of cutting and using lumber of different grades. From time to time take a car of this grade, cut it up and keep a record of results, then a car of another grade and so on through the list of grades. From comparing results one should be able to establish a relation of values between grades that will prove fairly reliable. It is a simple proposition to compare it with the current quotations at the time of purchase and determine what grade would be the best bargain.—Hardwood Record.

A waterproof glue may be made from three parts of gum shellac, and India rubber one part by weight, these constituents being dissolved in separate vessels in ether, free from alcohol, subject to a gentle heat. When thoroughly dissolved the two solutions are mixed and kept for some time in a vessel tightly sealed. It is further claimed that this glue resists the action of water, both hot and cold, as well as most acids and alkalies. If the glue is thinned by the admixture of ether and applied as a varnish to leather along the seams where this has been sewn together, it renders the joint or seam watertight and almost impossible to separate.

Faked Furniture and Spurious Antiques

Collectors of antique furniture need to be very wideawake nowadays if they wish to protect themselves against the tricks practised by some dealers. Perhaps one of the cleverest dodges is that worked by the large and wealthy dealer with a good clientele. Should a prominent and influential customer be dissatisfied with his purchase, the dealer promptly offers to take it back and refund the full purchase price. Indeed, he will go further, and offer a price which allows the customer a profit on the transaction. But the dealer is careful to take a receipt, and once he has got this there is nothing easier than to offer the article at a small profit to a millionaire collector from the States as being from the collection of Lord So-and-So. The bait usually is taken at once; the dealer laughing up his sleeve, while the American carries home his "bargain."

Many a spurious antique has been hall-marked in this way, according to a writer in the English Review, who proceeds to give away some interesting secrets of actual furniture faking. Dealers, it appears, are always on the lookout for old half-timber houses and barns furnishing a good supply of oak, for the wood, although full of mortise-holes and cut nails, makes very good "Tudor" furniture or panelings.

If the faker is lucky he gets the worm-holes thrown in; otherwise, if time allows, he makes them with genuine worms, for he knows that the latter never bore straight, but seek all the soft spots in the wood, and he is much too clever to imitate their borings by the insertion of a wire or hairpin.

One drawback of the old timber, from the faker's point of view, is that many of the rusty nails cannot be drawn, and the circular saw has to cut right through wood and nails. The wood, however, being cut, is planed up and finished with a "York-pitched" plane, where the iron, owing to the sharp angle and the hardness of the wood, "kicks" in a way that produces almost the same result as the primitive adze of Elizabethan days.

Wormy Chestnut and Panel-Making

It is one of the old superstitions, to use a rather harsh word, of the panel trade that wormy chestnut is best for corestock in panel work because of the fact that it contains worm-holes. A leading panel manufacturer, who has studied the scientific side of the business as thoroughly as anybody in the trade, laughingly remarked that while a lot of the boys in the glue room believe that wormy chestnut would be used regardless of price, he would willingly turn to some other grade if wormy chestnut went up too far.

"As a matter of fact," he said, "the worm-holes have nothing whatever to do with the efficiency of the wood for corestock. If the glue had to depend on the holes to get the proper cohesion, I'm afraid the panelmakers would have their troubles. The fact that we get equally good results when other material is used for various purposes demonstrates the fact that the incidental defects make no difference one way or the other."

Time Studies and Increased Efficiency

Establishing Tasks and Inducing Workmen to Accomplish Them—A Particular Method from Which General Principles may be Derived

By Ralph W. Langley

THE purpose of these informal notes is to give an account of some difficulties met in establishing tasks and inducing operators to accomplish them. It is not assumed that the methods of meeting these difficulties would succeed equally well in all industries. However, they have been found to be at least partially successful in the particular industry to which they have been applied; namely, the manufacture of coils for electrical purposes.

The Collection of Data

The first step taken in establishing tasks was to collect data by means of time studies. Before the results of these time studies were filed as permanent records, however, every effort was made to supply the operator with the best facilities for doing the work. In fact, several days were largely taken up in recording conditions which needed improvement. This part of the work has continued to call for attention even after it appeared that every possible improvement had been made, and a list of things to be done is kept and checked off as accomplished.

The various departments were taken up separately, an important operation was chosen in each, and the operator who was said to be the most skillful was studied first. Various operators were chosen at random, studied in the same kind of work, and the time taken by each operator for a given element was compared with that taken by the others. The results were often surprising, for the operator who was considered the most efficient by the foreman was often found to be inferior to one with no apparent claim to merit.

Best Operators for Time Study

The choice of operators to be timed was limited to those who were proficient in the kind of work to be studied; of these, the operator was chosen who most often repeated the various elements in the same order. The objects of the time study were explained to the operator as clearly as possible in the beginning and especial emphasis was laid on the statement that a piece-work rate was not contemplated. It was noticed that when an operator starts, even on work to which he is accustomed, the time taken at first is longer than after the first six or eight pieces have been completed; as the operator becomes fatigued, the time taken to pick up small objects is the first to become longer. If the work was such that several sequences of the various elements could be used, the operator was induced to try them all in order that the one shown to be the shortest might be selected and studied. After some experience it was possible to tell off-hand, in most cases, whether the usual method was the best.

The Attainment of Accuracy

For accuracy, reliance was placed on a large number of observations made at various hours of the day on one operator. When the same operation had been observed 30 or 40 times the elementary times were selected and the minima chosen. These elements were found valuable in starting new work to determine whether or not the operator was trying to mislead the observer.

More concordant results were obtained by using a "running watch" whenever possible, that is, to start the watch and read it at intervals during the operation, and to start again when the operation is repeated. Elements as small as could accurately be recorded while the watch was running were chosen, but it was found much more important to choose an element with a sharply defined ending than to take one shorter and less well defined. The individual time for each of a series of elements chosen primarily, because they are sharply defined, will invariably be more concordant and accurate than if the operation had been separated into the shortest possible elements without regard for clearness. That time which occurred most often was selected as the so-called minimum.

If it was necessary to find the time taken for an element too short to be determined with a running watch, it was obtained independently on another series of operations. The elements were recorded as fast as they were accurately determined and while still fresh in the memory of the observer. It was found best to tabulate them primarily according to the operation, and, secondly, according to the type of coil.

Fatigue Allowances

Another difficulty is to determine the fatigue allowance. If the time allowed for a task was the sum of the minimum times for all the elements involved, only the most expert operators would accomplish the task, and only when no unavoidable difficulties arose. In order to enable the expert operator to accomplish the task consistently and the less experienced operator to accomplish it at all, a certain additional time must be allowed. This is a more or less arbitrary percentage of the sum of the elements called the fatigue allowance.

The necessary fatigue allowance for any class of work was determined by making detailed time studies of the less expert operators at various hours of the day. Any avoidable delays were deducted and the difference between the actual time consumed in completing an operation and the theoretical time calculated from the elements was called the fatigue allowance in the task as set for an average operator it was assumed that increased skill due to practice would in a measure offset physical fatigue.

The Advantage of Definite Sequences

A strict sequence of elements for a given operation seems to be of great advantage to the operator. This becomes irksome to some who vary the monotony by using various sequences, but this is never done by the most successful. In fact, a uniform sequence of moves is a good criterion of the operator's skill.

Having collected enough data to make a start, the most skillful operator was assigned to a task. Fortunately, Mr. H. K. Hathaway pointed out the importance of encouraging the operator and directed that each piece be timed at first until the operator gained confidence. The task was accomplished, and other less skillful operators became interested and increased their output even before being assigned a task, apparently to

see what they could accomplish. Inexperienced operators on bonus began to exceed the former output of the most skillful.

At first the task seems so difficult in comparison with what is tacitly considered a fair day's work that it is hard to induce anyone to consider it seriously. If one operator can be induced to accomplish it others will follow, but unless especial attention is given to this in the beginning it soon becomes a tradition that the task is impossible because no one ever did it—because no one ever tried.

On the other hand, a group of earnest operators will soon gain confidence in the fairness of the time allowed on new jobs and will attempt the task without question.

In the coil-assembling department the variety of work done by each operator was great when the system was first established. The principle was that any operator should be able to do all kinds of work equally well. Absolutely no tasks worth mentioning were accomplished until this theory was abandoned. The operators were separated into zones with an instructor for each zone. As far as possible each zone specialized in one kind of work. An increase in the number of tasks accomplished followed at once. This was increased as soon as an instructor earned a bonus.

Difficulties of Task Work

The most serious difficulties in the way of accomplishing every task are as follows, assuming that the time allowed is correct:

1. Selection of earnest operators.
2. Selection of suitable instructors.
3. Operators' lack of confidence with new work, fear that time will be cut, and lack of initiative to try to accomplish a new task; cliques among the operators to obtain more time for a job by failure to accomplish it.
4. Routing of work to operator least fitted to do it.
5. Preparation of instructions that will be detailed, concise, and impossible to misconstrue; and the inducing of operators to follow them carefully.

As regards the selection of operators a process of elimination has been followed. The choice of instructors is limited to the operators. Both of the conditions need attention. Lack of confidence and initiative, as well as cliques among the operators, should be followed up and reported by the instructor to the time-study man. It is hard to induce the instructor to keep the time-study man posted on prospective failures to earn bonus, and many tasks are lost because the operator does not know whether or not he is falling behind. The most successful instructors are those who keep close watch on the output of each operator until he gains confidence. Instructors who can use a watch are of great assistance. Often operators will refuse to attempt the task, and when it is demonstrated will say that they can do one or two pieces in the time allowed but not the batch. When the observer is positive that the operator is deliberately trying to mislead him and that he is perfactly able to accomplish the task, he informs the operator that he can accomplish the task or leave. In some cases the operator will proceed to work and finish in 70 per cent. of the time allowed. It would seem that a book of shop rules to be given each operator, outlining clearly the policy of the management as well as the rules of the shop, would help to solve this problem, and eliminate many misconceptions.

If it is possible to assign work to the operator best suited to it, the chances are naturally more in favor of success. A tag with each operator's name and, as far as possible, a list of work on which he is most expert, is kept on the bulletin board to help in this respect. This tag moves to the hooks together with the job ticket on which the operator is at work.

Instructions that are both complete and concise as well as detailed are difficult to prepare; some quality must suffer as the others improve. It proved necessary to sacrifice detail, at least temporarily, because of continuous changes in the specifications and rush on new work.

Minutely detailed instructions were found invaluable in training new operators when the instructors would use them as follows:

The instructor gives the instruction card to the operator and tells him to read, as the instructor demonstrates slowly and names the various objects as they are handled. This method accomplishes several things; it fixes the names in the operator's mind, insures a definite sequence of moves, prevents mistakes, and at the same time it increases the instructor's efficiency. If the operator forgets how to start a thirty-minute operation after the instructor has finished it, he is more apt to consult the card than appear stupid by calling back the instructor.

In short, it was found that the duty of the time-study man had only begun when he had accurately set the task. Unless he makes it a point to visit each department and see each instructor, daily if possible, a great many details which are vital to success will be ignored, and unless he makes every effort to exercise tact he may only succeed in defeating his own purposes. The utmost conservatism in his views as expressed regarding the tasks is essential, up to the point where he is able to satisfy himself that the task is a fair one. This offers an excellent opportunity to exercise his powers of patience as well as observation; and he is constantly reminded by circumstances that it is just as easy to be mistaken as it is necessary to be right.

It has been our experience that much trouble can be caused by setting a task on new work, and using elements selected from similar work, if there is any doubt that the two jobs are exactly alike. If the operator fails to earn the bonus he will usually take twice the time allowed even if he could finish in a little more than the allotted time. This is possibly due to a feeling of resentment. It is not unusual to find that a liberal time allowance on bonus will double an operator's output over that accomplished on day work. If the time allowed is so short that only the one expert can finish in time, the three other operators of average skill will consume twice the time allowed. It would seem that the greatest good for the employer and the greatest number of employees demands a liberal time allowance with a fair bonus rate rather than an extremely close time allowance and high bonus rate.

How to keep a plant clean is one of the problems that some factory owners are wrestling with. It is really a condition more of habit than plan. There are many satisfactory plans and methods to follow, either of which will give good results. The main thing is to insist on cleanliness and develop the habit of keeping things in order.

Some of the most beautiful cabinet woods found are difficult to finish with anything but a scraper. This should stand as pretty good testimonial to the scraper as a means of getting a fine finish on wood.

How to Make By-Products Pay in the Cooper Trade

It is estimated by tight barrel coopers who know their business that the waste of material, from various causes, in the manufacture of these packages is something like 10 per cent., says the National Coopers' Journal.

If the cooperage industry stood for this waste, without making a powerful effort to remedy it, it would stand almost alone in that respect; for the thrifty pork-packer of tradition, who boasted that he used every part of the pig to advantage except its last lament, is no longer unique in American industry, if, indeed, he ever was. There are many manufacturing enterprises in which research and experiment, together with careful study of all possible markets, have resulted in making once useless by-products quite as important as the principal goods manufactured by the concern, and in every industry there is much to be gained by a study of profitable disposal of material which must otherwise be wasted.

It may be safely asserted, perhaps, that the forest products industries have, until recent years, at least, been the most wastefully conducted of any even in a country which is proverbially wasteful; and possibly the cooperage industry is no exception to this general rule. Logs are wastefully cut in the forests, wastefully cut into staves, and that material, in its turn, is wastefully used—although the waste is usually pretty carefully watched here, as the cost begins to amount up. It is in the cooper shop, however, that, as indicated, the most obvious loss occurs; for the cooper pays out big money for his staves, and all those cast aside as defective or unusable for any other reason represent a plain loss, unless there is some way of utilizing them.

Hence it is largely true that in the cooperage industry most of the progress toward the utilization of small sizes of various sorts has been made by concerns purchasing their raw material from the manufacturers, rather than by mills cutting staves in the woods. The latter, having before them great quantities of bolts awaiting the saw, lack the necessary conservative attitude toward wastefulness which would impress at once the maker of barrels, who had to purchase his staves.

The Cooper Who Also Makes Stock Has Best Ideas Of Utilization

It is the cooper who has a mill, as well as a factory, who occupies the happy middle ground, and has both the opportunity and the incentive to look about for some means of eliminating the waste of that relatively high percentage of good timber which cannot be used in the making of standard size packages.

Freight Rates Operate to Prevent Stave Manufacturers Utilizing Waste

The man at the stave mill, moreover, nearly always has to consider a serious problem in the shape of slow and difficult wagon haulage and a freight rate to the market which is by no means based upon charitable considerations, in the average case. This not only operates to destroy any thought of making use of the "unconsidered trifles" in the way of short pieces of good oak, but to make any attempt to preserve and forward them to some point where they might possibly be used, rather too expensive for serious consideration.

Efficient and Scientific Manufacturing Management Must Come

And yet, in this day when everybody is pretty well aware of the fact that our forests are not going to last forever, unless stringent conservation and reforestration measures are taken, and when efficiency and scientific management, which mean nothing if they do not mean the elimination of waste, are the order of the day, it would certainly seem that the cooperage industry should not be alone in this respect, nor lag behind in the race for the achievement of really economical manufacturing methods.

As a matter of fact, there are not a few concerns in the cooperage line which have done creditable work in disposing profitably of the considerable quantities of short lengths which accumulate at their busy plants from broken and defective staves, and have arrived at the point where there is very little real waste in the long run, notwithstanding the percentage of cast-offs in the regular sizes remains as high as ever.

Fancy Packages Take Care of Small Waste

The demand for small fancy packages in the various branches of the liquor business has been responsible for the consumption of a good deal of this material, and at good prices, too. There is a concern in an Ohio Valley city which has built up an extremely profitable business in small and handsomely finished kegs, or miniature barrels, as they might be called, are in high favor for souvenir and presentation purposes with many distillers and rectifiers, and the cooperage concern mentioned has found a good demand for this particular product. The packages are made in sizes small enough to hold only a gallon, and run from this on up to sizable containers of ten or fifteen gallons.

A St. Louis firm has shown the way to a good business in odd and small sizes. It owns the patent on a very effective and handsome water-cooler, made entirely of wood, and disposes of a large quantity of these containers right along. The cooler is really a double barrel, calling for twice as many staves as its outward appearance would indicate, this style of construction, of course, enhancing the refrigerating effect of the ice. The sizes vary from about three gallons to fifteen gallons.

The smallest size calls for a very tiny stave, considered as a stave, its height being but little over a foot; and the heading is equally diminutive, thus giving an outlet for some very small sizes of waste. The top, of course, is removable for the purpose of putting in ice and water. The hoops are of polished brass, and the spigot is also of brass. These cooler-barrels are handsomely finished in every way, a coat of varnish in a rich, dark tone giving them all the polish of a good piece of furniture rather than a barrel of commerce.

Moreover, when it is considered that the smallest size sells, completely equipped with stand, for five dollars, and that the prices range upward to more than double this amount for the largest size, which is still

only about one-third the size of an ordinary barrel, it can be easily understood that there is real money in the business. When the prices which are received for full-size barrels are considered, the cooper may well envy the company which gets such good prices for an article made of offal, which was once burned or thrown away.

The paint business once took care of a very large quantity of small-sized waste pieces from cooper shops. Kegs, or buckets, ranging upward from the quart size to those many times as large, were universally used as containers for leads and oils, and nothing else was seen; and as the paint business as a whole is one of staggeringly large proportions, this outlet for the by-product of the cooperage plant, as well as the stave mill, was one which could be counted upon with certainty. In fact, as a rule waste material was not sufficient to take care of this demand, it was necessary to make up from full-sized material the Lilliputian staves and heading for many thousands of small paint packages.

The Making of Wooden Paint Packages

Unfortunately, this is no longer the case, however. To a remarkable, not to say discouraging, extent, steel has taken the place of wood as a material for the paint package, until now many manufacturers of lead and colors use nothing else. Without going into the respective merits of metal and wood packages, which make a somewhat extended argument, it might be suggested that this falling away of the paint trade is to a large extent due to the fact that manufacturers of wooden paint packages have not always been as careful to put out a really tight container as they might have been, with the result that consideradble dissatisfaction arose over the constant leakage experienced.

The objections lodged against wooden packages by paint manufacturers are for the most part based upon this defect, which in a good many cases is probably due to faulty construction.

Another objection is the difficulty of cleaning the wood package after it has been used, in order to fit it for second use as a paint pot or for some other purpose; and the greater mechanical difficulty of closing and opening the package after it has been filled, as compared with the steel container, forms the last of the several objections which have together operated against the wooden package in the paint field.

As suggested, it may be possible for part of this business, at least, to be regained by a satisfactory demonstration to manufacturers that paint packages of wood are in reality tight enough to serve their purpose. Even if this branch of the business, which formerly took care of so much of the short sizes resulting from the manufacture of ordinary-sized barrels, is gone forever, however, it still remains true that "there are as good fish in the sea as ever were caught."

The wooden keg water-cooler, described above, shows only one of the numerous uses to which a strong and serviceable container, made of the small sizes culled out of the ordinary run of staves and heading, may be put. The fancy liquor-package business is one which has great possibilities for the cooperage concern which will give it a little attention, and make some effort to furnish just what the market requires; and there are undoubtedly other opportunities awaiting the package manufacturer who has his eyes open, and who appreciates the desirability of utilizing profitably the by-products of his plant.

A pulley with a face burnished smooth as glass and polished like silver denotes slip. The discrepancy in the speed may not be proclaimed by a creaking belt, but it is there; a continual waste. The pulley may be undersized for the work or the belt slack or too frail, or its face glazed and dry, or a bad type of fastener is in use—any one of which may cause the trouble.

Opportunity for Hardwood Flooring in England

A recent consular report states that the use of hardwood flooring in London is insignificant when compared with the use of soft woods. Hardwood is used to some extent in dance halls, skating rinks and in private houses where much entertainment and dancing is given, but even in such cases the flooring takes the form of parquetry rather than the hardwood flooring so widely used in America. The hardwood for English flooring is derived chiefly from Canada and the States.

It is believed that hardwood flooring will be used more generally in London partly because of its sanitary features and also because of its beauty and the ease with which it can be cared for. It would seem that manufacturers of hardwood flooring would find a profitable market for this material by pushing it in the big markets abroad.

It Can Be Done

Somebody once said that it couldn't be done,
But one, with a chuckle, replied,
That "maybe it couldn't," but he would be one
Who wouldn't say so 'til he tried.
So he buckled right in, with the trace of a grin
On his face. If he worried he hid it
He started to sing as he tackled the thing
That couldn't be done—and he did it.

Somebody scoffed:. "Oh, you'll never do that;
At least no one ever has done it."
But he took off his coat and he took off his hat,
And the first thing we knew he'd begun it;
With the lift of his chin, and a bit of a grin,
Without any doubt or a quiddit;
He started to sing as he tackled the thing
That couldn't be done—and he did it.

There are thousands to tell you it cannot be done,
There are thousands to prophesy failure;
There are thousands to point out to you, one by one,
The dangers that wait to assail you;
But just buckle in with a bit of a grin,
Then take off your coat and go to it;
Just start in to sing as you tackle the thing
That "cannot be done"—and you'll do it.

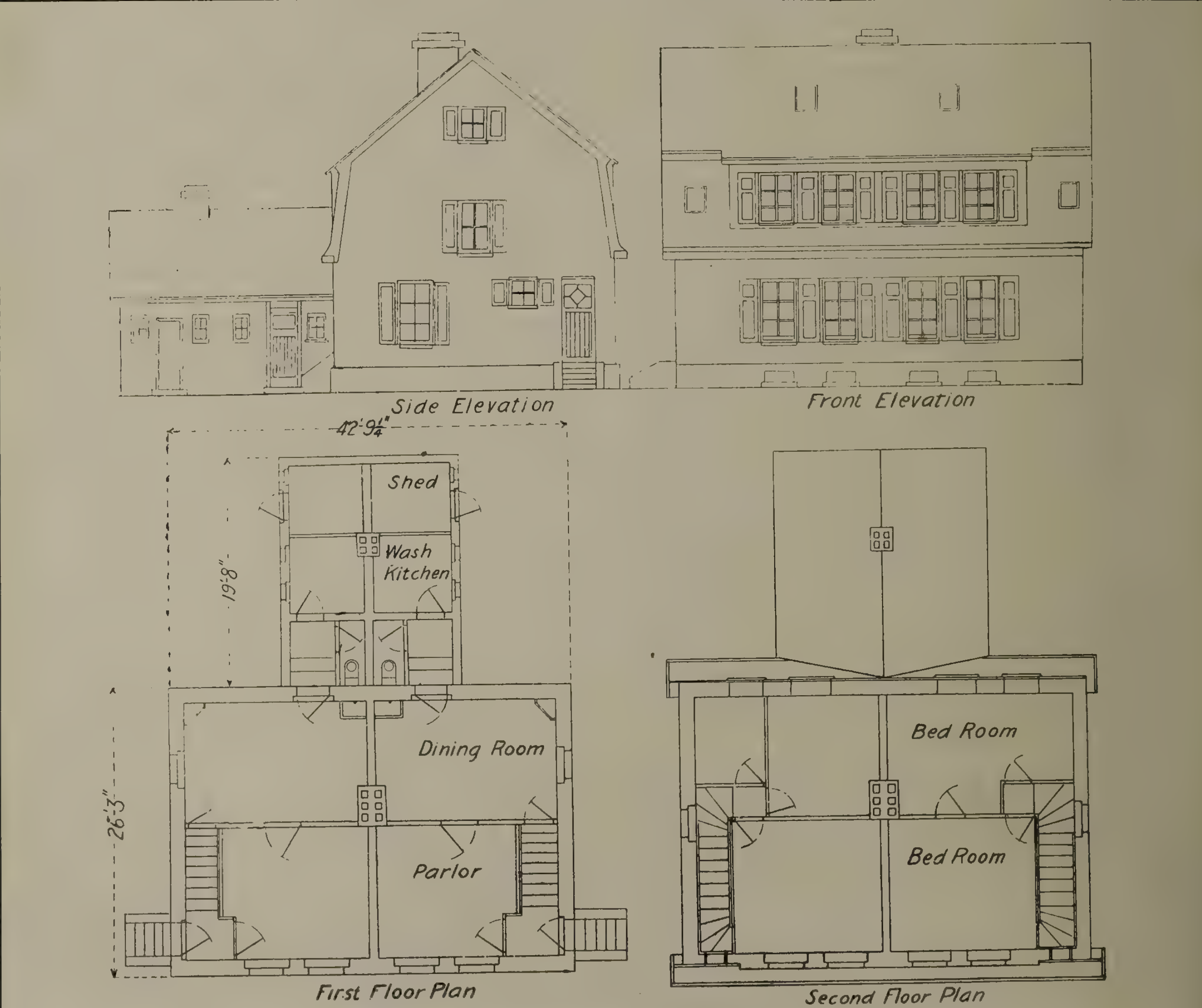
Carpentry and House-Building

A permanent department devoted to practical problems of construction and planning. Readers of the Canadian Woodworker are invited to contribute to this department and to submit details of work involving special difficulties.

Suggestive Design for Workmen's Home

NO little interest is attached to the improvement that is taking place in the type of workmen's houses erected in the older countries. We reproduce herewith a design for a house erected by the Becker Steel Works—a large manufacturing establishment situated at Willich, near Dusseldorf, in Germany.

In the Fatherland, increasing care is given to the physical and mental welfare of workmen. In the woodworking trades, as in most other important industries, not only are continuation schools provided wherein apprentices are required to continue their education along lines which will fit them to become more efficient in the particular branch of industry which they have chosen,



Simple and economical design for workmen's houses.

but every facility is provided for maintaining their health and comfort. In Germany it is a recognized fact that a workman is not efficient if the conditions under which he lives, when away from the shop, are not of a character which affords him a certain degree of comfort.

The Becker Steel Works, to which we have referred above, was founded in 1908. Immediate steps were taken to build up a body of workmen and have them settle in Willich. To do this, it was necessary to provide dwellings for them, as in Willich the number of suitable dwellings was limited. Arrangements were made to have a number of one-family houses erected for the workmen and also for the other members of the staff. The houses contain, besides the attics, four rooms, scullery and wash-kitchen. Attached to each house their is a shed annex to enable the tenant to keep pigs, poultry, etc. In front of the houses are flower-gardens and at the back kitchen gardens.

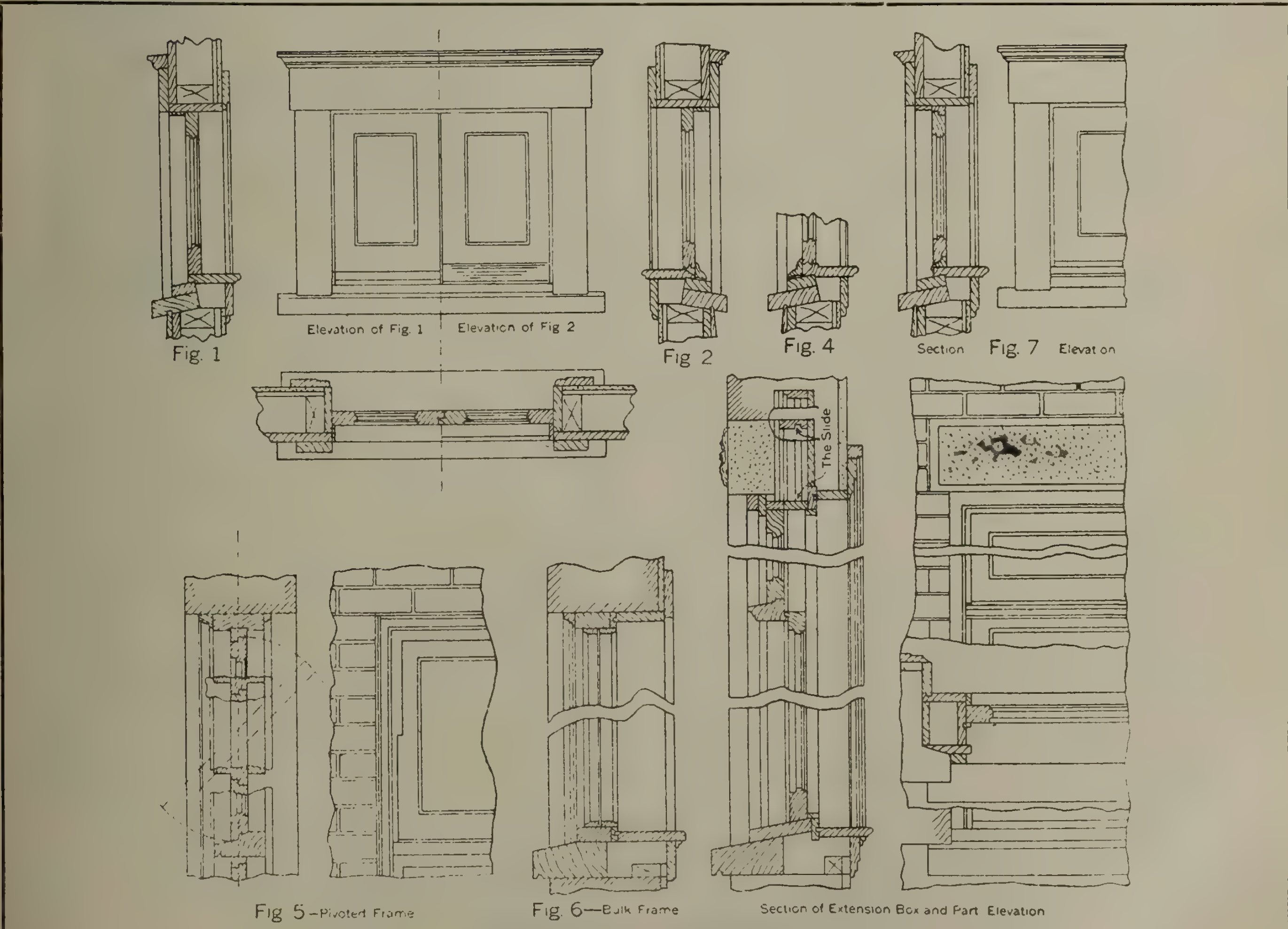
Besides twenty larger houses for the officials, which are equipped with central heating, bath-rooms and other conveniences, there are forty workmen's houses and a further twenty are in the course of erection. The latter will be finished this year. The average cost of the buildings amounts to from $1,550 to $1,700, according to the size and finish. The money was advanced in the shape of a mortgage to the amount of 85 per cent. of the cost.

Practical Frame Construction

SOME useful hints on the subject of frame construction are given in the Wood-Worker by Jno. Wavrek, Jr., who cites the interesting experience of a lady who when building a house decided to have all casement frames. Mr. Wavrek's connection with the job is given by him in part as follows:

"It seems she gave the whole matter into the hands of a contractor who had not had any experience in this style of frame construction, and as a result she had all kinds of trouble with them; wind and rain had easy access into the interior, of which they took all the advantage possible, due to the faulty make-up of the frames. The firm with which I am connected was called upon to send somebody to look the proposition over and suggest a means of overcoming the unbearable condition, and I was sent to look into the matter and make a change for the better, if possible.

The rain would blow in so badly that it was found necessary to put rags on the window seats to absorb the water which came in in streams when there was a strong wind with the rain. There is undoubtedly more than one way to construct the casement frame, but it seems to me there could not possibly be a more



Details of frame construction.

ignorant way of making them than the above mentioned one.

The sash opened towards the inside and rested directly on the window seat; also, they were rabbeted in the center, and any moisture that would enter by way of the joint in the meeting stiles would invariably run down onto the seat. As considerable play had been allowed at the bottom of the sash so that it would not rub on the seat when being operated, the elements had easy access to the interior. When this condition became unbearable, the lady put the matter up to the contractor, who told here he could overcome the trouble by putting weather strips on. As a result of this advice some $60 was spent in weather strips, which did not and could not keep the water out.

The proposition required quite an amount of study to arrive at a suitable solution of the matter. Necessity, said to be the mother of invention, favored me with an idea which was put into execution; and, although my method may be but an adaption of others' methods, I am not aware of the fact. I proceeded to make the change as shown in the accompanying sketches. Fig. 1 shows the arrangement as it was in the first place. Fig. 2 illustrates the changed and very satisfactory job as it is at present.

I proceeded to cut away the window seat beyond the rabbet of the meeting stile, so that the dripping water could not run down on the seat, but would run down on the beveled part and from there escape by way of the openings in the weather strip at the bottom, which also prevented the rain from entering.

Another method, and one which is used very extensively, is shown in Fig. 4. This is a casement frame which has both sash swinging outwards and can be made weatherproof more readily because it allows of a rabbet all around. However, the great objection of this style of a frame is the fact that it does not allow of a fly screen being fastened on the outside, because it would be a hindrance to opening the sash. If it were not for this drawback this would be an altogether satisfactory frame.

Another kind of frame is one having sash or transoms which are pivoted at the sides. This frame is shown in Fig. 5. The feature of this frame is the rabbet strips at head and sides. It will be noticed that the sash swings in at the top and out at the bottom. The strip is therefore made in the peculiar manner in order to allow the sash to swing as stated, and at the same time is an excellent weather stop. This style of frame is used mostly in factory buildings.

Fig. 7 shows the best method, to my knowledge, of making the best casement frame. Fig. 6 shows sections of a bulk window frame such as is used mostly in store buildings for show windows.

Another style of window frame is shown in section and elevation. This frame, known as the extension box head, is used very much in the front elevations of the better grade of houses. The use of the extension box is to receive the lower sash when being opened; as the latter sash is usually about three-fourths the total size of the frame, it would not open far enough if it were not for this feature in the construction of the frame. The transom at the top is stationary; that is, it is not arranged to be opened. The transom bar is provided with a check for the bottom sash. This completes a good looking as well as serviceable frame.

Although there are many things besides the foregoing that could be said on this interesting subject, it will have to be sufficient for this time.

Cabinet Work for the Carpenter

By Paul D. Otter

On a closer inspection do we get well acquainted with that in which we are interested, but how disinclined are we to go after information which most usually is stored up in large volumes; for after nightfall most of us feel too luxuriously indolent to hold up a book of reference, much less take notes therefrom. There is truly some effort in the use of dictionaries and encyclopedias on account of their unusual size and weight, and whatever facilitates frequent inspection of them and a regular habit of reading varied literature, while occupying a comfortable chair at a restful angle, will, I am sure, impel our craftsmen friends to prepare plans for the making of a reading table after the suggestion shown in Figs. 1 and 2.

It will be seen that the three parts of the table rest upon the framing of the rails to the posts, the two outside portions of the top being securely held thereto by screws counterbored through rails, while glued corner blocks may give the framing greater stiffness.

The centre of the table is a frame filled with a larger fixed panel shown at A in Fig. 3, and the smaller, shown at B, is loose and swivels on steel pins properly

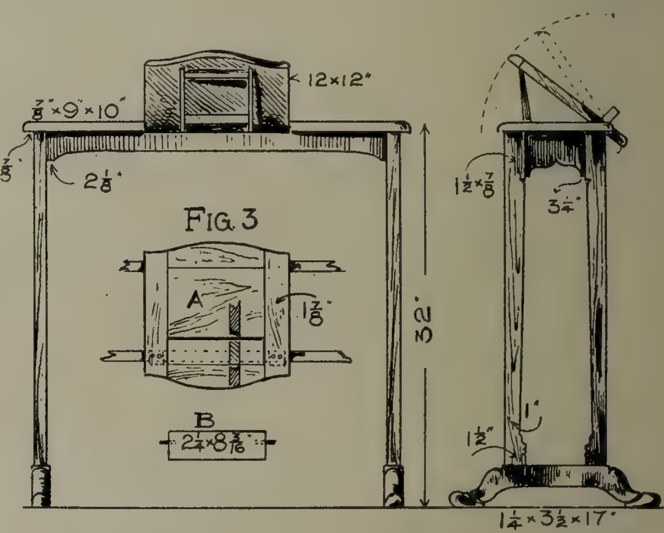
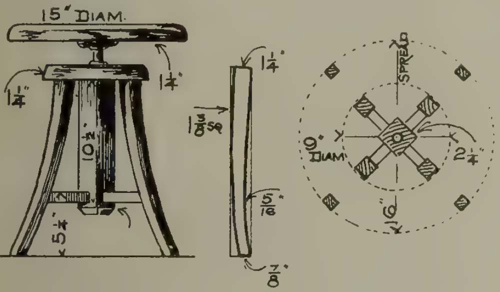


Fig. 1, 2 and 3.—Elevations and details of a reading table.

located so that it may be swung up at right angles when needed to rest the book upon. The fitting and adjusting of this swing piece is done in connection with fitting up the frame, and when ready to glue up, the steel pins are inserted with a very thin washer between to insure free action. The larger panel is also set in, being fastened permanently with glue, and the entire frame glued together and held in clamps until dry. By the exercise of a little care the swing book support B may be so fitted that only a very slight crack will show on the surface of the table; for detail of this see Fig. 3, A and B. By experimenting you will find that the edges of movable and fixed parts will have to be treated from underneath as indicated in the section shown. After framed-up panel has been fully completed it is fitted in between the two tops, trimming just sufficiently to avoid binding. Then locate and mark places for two hinges on one side and after these have been fitted to allow all tops to be flush, proceed to arrange for a swinging adjustable support. This is shown in the drawing, but many other ideas may be suggested while you proceed with the work. The scheming and creation of simple devices is a great part in the pleasure

in making furniture. It may be that a small drawer or compartment would be desirable. Sufficient to hold pencils and note paper, and the supporting device would have to be such as to not interfere—think it out. That is one of the privileges and the joy of a craftsman, to scheme and create simple devices that add to the utility or aids in the economy of space. Recently the writer dealt with an arm chair designed for the private car of a president of a large railway. His desire was to have a tablet drawer for paper under the seat; and in the roll arm, his mechanic had secreted a brass tube to contain pencils, one tube working within another and controlled by a secret spring. That chair, personally, was gratifying and he always knew where to find his writing material.

The pattern of piano stool frequently on sale, or handled by the piano dealer, bears little resemblance to style or features of the piano you have selected. As the designs of pianos are now under the influence of more restful lines and reposeful surfaces, the form of stool with turned legs, cast claw and glass ball fails to harmonize, and with this thought such a stool has been transformed and is illustrated in Fig. 4. Piano stools are not usually made by piano makers and we will assume that the reader possesses the conventional type which the piano salesman has presented to him,



Figs. 4, 5 and 6.—Details of Piano Stool

for it is generally "thrown in" as a generous gift after the sale of the piano has been closed—one never quarrels with a gift, at the time, but surely most frequently that stool does not match the piano—so withdraw the screw and nut, as you probably will not be able to get one elsewhere; also save the tops and otherwise use the general proportions in constructing a type of stool which will be more in keeping with your particular piano. As in all forms of furniture, the attractiveness is quite entirely in the good workmanship and the final finish. This simple pattern is offered, but modifications may readily be made in introducing certain cuts or features that stand out as a main feature of the piano case in question. The central square column which is bored out to receive the screw and nut may be treated like a "square turning" in which you can introduce the predominating mold appearing in your piano. In this way you individualize your work and it becomes interesting by just that much of yourself put into it.

In selecting the material for the four square taper legs you may be fortunate in finding a piece of 1⅜-in. stock in which the grain happens to run in a slight curve in line with the paper pattern you have made. Nature is often very accommodating that way if we take a little trouble to find it out, and this feature of cabinet making is the secret of the "old masters," of getting into harmony with their work and material. It is the intuitive bump cultivated so highly which has made their work so prized and enduring. Now, these legs, for instance, may, by a little sorting over or even turning the pattern in a proper way, be made entirely in tune with nature's grain, assuring us that there would be little possibility of one or all of them splitting later on by a badly selected short-grained piece. This is mentioned at some length, for it is the little preliminaries of laying out and beginning which bring about strong and satisfactory furniture. A pattern may be secured from drawing of the dimensions given in Fig. 6. With the pattern cut out of stiff paper, lay it over the selected material of 1⅜-in. squares and mark all of them. Then saw them on a band saw, or reduce to a line by draw knife and shave, after which they must again be marked, putting the pattern over the shaped surface and marking with a pencil. A good way to mark a re-shape is to have sufficient thickness of stock in your squares; then mark the pattern on one side; turn it over the back corner and mark again. Saw out and replace with small brads the first refuse piece which contains your marking; then proceed to saw again. You will appreciate this method when dealing with the situation, particularly when proceeding to saw out a claw foot, or leg of various curves or indentations. It is better to preserve the shape of the original square when sawing the second time by tacking on the first waste piece.

The pedestal block is, when finished, 2½ in. square by 10½ in. long, and at the lower end a criss-cross mortise is made to exactly fit down over the 1-in. square criss-cross stretchers which have been previously halved together. A lower finishing cap is then made 1 in. by 2½ in. square with a ½-in. chamfer mold. This cap is finally glued over the finished surface of pedestal block and the lower face of the cross stretchers, passing a screw through all three parts, and small screws or brads at the corners into the end of the pedestals.

The outer ends of the stretchers have previously been cut to tenons on a slight slant to fit properly into the sloping legs of the stool. Fig. 5 shows the plan of the stool in relation to contact of legs at the floor and as they enter the round cap block over the square pedestal.

In a developing family, the piano bench is to be recommended. There is greater freedom of movement and it is condensed for duet purposes, or for the use of teacher and pupil, while the space under the seat is doing service for sheet music. As Figs. 7 and 8 clearly indicate a simple form of construction, little need be said. Great care should be given the selection of a well dried board for the top, as it is a free panel swinging open on hinges after the manner of a tool chest top. This top, which should have a final thickness of ⅞ of an inch, might represent some skilled joinery in the nature of a frame and an inserted flush middle panel, or if a solid panel be used it would be wiser to sink in two narrow cross battens and meet them lengthwise with battens glued to the surface, thus forming a slightly raised framing which would be within the outer frame of the bench when the top was down.

The bottom board of the music compartment, which is 2 in. in depth, should also be well selected to avoid splitting, and cut sufficiently large to have the under edge all around relished down to ¼ in. to fit into a corresponding groove provided on the inside of the rails before the entire construction is finally brought together and glued up. Glue corner blocks fitted and cut away to avoid being seen, and set against the posts under the bottom of the compartment, will also aid greatly.

A Finishing Room Cost System*

By Edmund Chase.

THE right stain and the right finish are the desire of every furniture manufacturer and paint shop foreman. These two items are more important than construction or style, for without them, no matter how well designed or made the product may be, it will not have a commanding sale. Many manufacturers and their foremen feel that they have attained this stain and finish. Since their goods sell in increasing amounts this supposition is fairly correct. Granting that their finish and color are correct, what does it cost them?

You ask the foreman in many shops as to what it costs him to finish his golden oak or any other color and he replies that it takes about so much of this and so much of that to finish a dozen or a hundred pieces. Up to a certain degree and a varying one, he is correct. For if you ask him how he knows, his reply is apt to be that when that pattern first came through the shop he measured the amounts of the various materials used on a certain number of pieces. This is the end so far as costs go. He has made no allowance for differences in the quality of the materials used, the great variation in wood textures even in the same kind of wood, the effect of temperature and humidity on the varnishes. His were right but only for that one time.

Where the conditions under which the materials are being used such an important factor in the amount used a more accurate system of costs should be established. Such a system I believe is embodied in the following outline and will be of service to manufacturers and foremen.

Some changes may be necessary if varnish dip tanks are not used or if varnish drying kilns have not been installed. These changes will not affect the utility of the system, however.

The Beginning of the Cost System

The first step is to take a complete inventory of all the material used in finishing the stock after having left the finish sanding department. This inventory includes all the material in the shop or in the stock room. Second: Keep a record of all material in the line of finishing supplies that are received each day at the plant. This can be obtained from the foreman or stock clerk.

Third: At the end of any fixed period of time of some duration, two weeks or a month, take an inventory of all material on hand. Take this in the same manner as the one at the beginning.

The inventory taken at the end of the period can be carried forward so as to be used as the inventory to start the next period with.

Fourth: Open up accounts with the following:

No. 1. Sanding in the white.

No. 2. Each of the different stain tanks.

No. 3. Filling department.

No. 4. Each of the different varnish tanks, (if dip tanks are used.)

No. 5. Varnish drying department, (if varnish kilns are used.)

No. 6. Sanding between coats of varnish.

No. 7. Each of the brush coat finishes.

No. 8. Rubbing and polishing.

No. 9. Wrapping and bundling.

No. 10. Barn and cartage, (if any.)

No. 11. Shipping.

No. 12. Foremen.

No. 13. General shop expense.

No. 14. Costing.

The following expansion of the above accounting titles explains more fully the method of keeping them.

No. 1. Sanding in the white. Keep an account of all sandpaper used on this work so as to show the average cost per dozen or hundred. Take stop watch tests on various kinds of material and patterns going through to get the average time required to do each kind of stock and style.

No. 2. Each of the different stain tanks. Open accounts with each of the different tanks and keep them in the same form as the attached form No. 1. This will show the amount used during the month and will also show just what the mixture averages to cost for the month. It will also show just what the mixture is costing every day and also the cost for staining the different kinds of stock.

No. 3. Filling department. Keep an account so that at the end of the month it will show the amount used: the average amount used on the various patterns and the average time required to do the work in dozen or hundred lots.

No. 4. Each of the different varnish tanks. Keep accounts with these tanks the same as with the stain tanks.

No. 5. Varnish drying department. Keep an account of the total number of pieces dried to get the average cost per dozen or hundred.

No. 6. Sanding between coats of varnish or shellac. Keep this account the same as sanding in the white.

No. 7. Each of the brush coat finishes. Open up accounts with each of the different finishes such as: brush coat gloss; brush coat polish; brush coat shellac; also any other finishes that are used.

Always make a distinction between golden oak, mahogany, weathered oak and varnishing on the wood.

On each of the accounts for hand finishing, be sure and show the number of pieces finished and the amount of material used, (see form No. 2.)

This hand finishing requires close attention and it

* From the Furniture Manufacturer and Artisan.

would be a good plan for the cost man to measure the varnish each morning and to watch the hand finishing very closely during the day.

No. 8. Rubbing and polishing. This account must show the total amount of material used during the month so as to show the average cost per dozen or hundred on each style.

No. 9. Wrapping and bundling. Keep a record of all pieces wrapped and all bundled K. D. Also show the total amount of material used on this work during the month. Be sure and make a distinction between wrapped and bundled.

No. 10. Barn and cartage. Have this account show the total labor and material in this department. (This will, of course, include hay, straw, grain, shoeing, repairs on wagons and harnesses, etc.) At the end of the month show the average cost per dozen or hundred for cartage. The total number carted can be obtained from the shipper.

No. 11. Shipping. At the end of the month show the cost for shipping per dozen or hundred. Besides the shippers' time all other time spent on the shipping must, of course, be included.

No. 12. Foremen. This will, of course, include the foreman's time, but if the foremen do any finishing be sure and charge it to the account to which it belongs.

No. 13. General shop expense. Charge to this account all labor spent in moving stock and miscellaneous shop items not chargeable to any particular account.

No. 14. Costing. This account will show the cost of labor for costing which, of course, includes the cost man's time and other labor spent in helping him.

The Operation of the System

By opening the different accounts at the time of and charging to each account the amount of material in each department and keeping account of the material received in each department, at the end of the month it is easy to determine just the amount used in each department.

By doing this way, at the end of the month each process can be compared with the amount used and the amount allowed for the same.

On all day labor the costs must show the amount of work done. Care must be taken to charge to each account all the day labor chargeable to same together with the amount of work done.

All the piece work earnings can be charged each day to one account under the head of Piece Work Payroll.

At the end of the month when making out the balance sheet, get from the bookkeeper the amount of the office payroll and the piece work payroll. These deducted from the total pay roll will represent the day work pay roll, which should balance with the amount of the day work charged to the different departments. Make up an exhibit at the end of each month showing just how each account figures out showing the amount used with the amount allowed.

If the allowances are deficient in any of the processes they will have to be increased so as to agree with the amount used. The new allowance will be used in comparing the next month's report. If the allowances are excessive they will of course be decreased and used in the same manner.

The cost man will, of course, keep costs on large

FORM No. 1.

Date	Depth Inches	No. Gallons	Price per Gallon	Total Value	No. Pieces	Pattern No.	Style	Finish
July 15th	$8\frac{11}{16}$	104	.472	49.07	250	X	Chip.	Golden Oak Polish
Cr.	$\frac{8}{16}$	6	.472	2.83				
Balance	$8\frac{3}{16}$	98	.472	46.24				
Cr.	$\frac{1}{16}$	3	.472	1.42	120	259	Col.	Early English
Balance	$7\frac{15}{16}$	95	472	44.82				
Cr.	$\frac{1}{32}$	$\frac{1}{2}$	09	.05				
	Shrinkage	over ni	ght					
July 16th								
Balance ...	$7\frac{29}{32}$	$94\frac{1}{2}$	474	44.77				
Dr.	$\frac{5}{32}$ Benzine	2	.09	.18				
Balance .	$8\frac{1}{16}$	$96\frac{1}{2}$	.466	44.85				
Dr.	$\frac{6}{16}$ Varnish	$4\frac{1}{2}$	65	2.93				
Dr.	$\frac{3}{16}$ Benzine	$2\frac{1}{4}$	09	.21				
Balance .	$8\frac{10}{16}$	$103\frac{1}{4}$	466	48.09				
Cr.	$\frac{11}{16}$	$8\frac{1}{4}$	.466	3.84	264	3133		G. O. Gloss
Balance ...	$7\frac{15}{16}$	95	.466	44.25				
Cr.	$\frac{1}{16}$	$\frac{3}{4}$	09	.07				
	Shrinkage	over ni	ght					
July 17th								
Balance .	$7\frac{14}{16}$	$94\frac{1}{4}$		44.18				

FORM No. 2.

Date	No. Pieces	Pattern No.	Style	Finish	Labor Allowance	Material Allowance	Material Used	Cost
Aug. 31	45	5303	Amer.	G. O. Gloss	33	42	$3\frac{1}{2}$ Qt. Pol. Var.	1.18
	103	79	Col.	G. O. Pol.	47	53	1 Qt. Gloss	.21
Sept. 1	132	4559	Amer.	Mah. Pol.	55	52	$2\frac{1}{3}$ " "	.49
	9	161	Mission	G. O. Pol.	60	60	9 Qt. Pol. Var.	2.98

Total Allowance Total Used

lots going through the different processes so that in case he should increase or decrease his allowances he would have something to base his new allowances on. At the end of the month the expense accounts will be added together so as to show the total expense of the shop.

After the total expense is obtained then show the total general expense per dozen or hundred. The expense for each department, also the total shop expense and the expense per dozen must show on monthly report. The expense accounts are as follows: barn and cartage, shipping, foremen, moving stock and general shop expense, costing.

At the end of several weeks or months, depending on how long it is desired to run the costs, the cost man will be able to draw off a very complete set of allowance tables from which it will be possible to make up very accurate process sheets for every finish and style.

These tables can be very easily verified and brought up to date at any time to meet with purchasing prices or new conditions.

Varnish Troubles

The more general varnish troubles are: "Blooming," or the surface assuming a misty appearance, sometimes long after it is applied, caused by a damp or poorly ventilated room. "Crawling," or a furrowed surface, and "Pitting," or little pock marks on the surface, both caused by a change of temperature, or draft striking the work while the varnish is drying; also to applying the varnish over cold or insufficiently dry undercoats, or over a glossy surface without sandpapering. "Sweating," or a rubbed finish turning back to gloss, due to rubbing before the varnish was sufficiently hardened, or to hot humid weather. "Flattening," or deadening of the finishing coat, caused by undercoats or graining color not being dry; also to improper filling on unseasoned lumber. "Cracking," caused by too heavy coats or damp undercoats.

"Checking," or fine cracks, caused by exposing the surface to sudden cold, by washing the surface with excessively warm water, or by applying a coat of short-oil varnish over an elastic one. "Blistering," caused by exposing the surface to sun or heat while the varnish is drying, also to unseasoned wood or dampness in the wood or undercoating. "Specking" of the surface, due to a dirty foundation or brush, or to dust striking the work while drying. "Sagging" and "Wrinkling," caused by applying heavy, uneven coats. "Flaking" off of the varnish, caused by applying it over a wax preparation, or over a surface over which varnish remover containing wax was used and not thoroughly removed with alcohol or benzine. "Chilling," or the varnish in the can becoming specky in cold weather, due to no deficiency of the varnish, but to the congealing of the oil, which will resume its normal condition if the can is kept in a warm place.

"Blooming" can be remedied by rubbing the surface with a piece of waste, first dipping into water, then into crude oil. "Crawling," "Pitting," "Cracking," "Sagging," "Wrinkling," and "Blistering," necessitate sandpapering or removing the old finish and revarnishing as necessary. "Flattening" can be repaired by applying another coat of varnish, providing the undercoats are sufficiently dry. "Checking," "Specking" and "Flaking" require the removal of the old finish and revarnishing. "Sweating" can be overcome by re-rubbing, unless a varnish that will never dry hard was used, when refinishing over the old finish with a hard-drying varnish, which may be rubbed to a dull finish, will be necessary.

Talks with the Varnisher in the Finishing Room

I wonder how many have seen a case of spontaneous combustion of oily waste in the finishing-room, says A. Ashmun Kelly, in Wood Craft. The writer has been fortunate enough, if he may be allowed to call it so—seeing the dangerous possibilities of such a happening—to have witnessed it.

A bunch of oily rags, used in rubbing with boiled oil, was left on the brick pavement of a room on the ground floor, and soon was smoking. The building was large, some 50 feet by 200 feet long, and had two storeys. Some months afterwards the building was totally destroyed by fire, and I was one of the losers by the fire.

What causes spontaneous combustion of certain materials. A few years ago a German chemist, Dr. Kissling, made some interesting experiments, together with observations on the spontaneous combustion of textile fabrics and other porous bodies impregnated with linseed oil, and his is the only account I have ever seen of this interesting subject, a particularly interesting one to us who have to do with oily waste, subject to spontaneous ignition, and often no doubt the cause of fires of mysterious origin.

Air Action on Linseed Oil

As a result of the finely divided state of the oil in such cases it readily absorbs oxygen, undergoing thereby a greater or less increase of temperature. With Kissling's fifty experiments, however, actual spontaneous ignition took place in one case only; in all the rest other heat than that generated by the oxygen absorption came into play. In this single case the vessel in which the experiment was being made broke, and Kissling saw sparks and glowing embers through the crack. When, as must often happen, the internally generated heat is supplemented by additional heat from external sources, ignition often takes place.

It is well known that the absorbing power of linseed oil for oxygen is increased by heating it alone, and still more by boiling it with small quantities of oxide of lead or manganese. Oil so treated is known as linseed-oil varnish. Kissling, not quite accurately, calls plain boiled linseed-oil varnish. An oil properly treated with metallic oxide will absorb as much oxygen in twenty hours as a raw of plain boiled oil will do in several days, although, curiously enough, the total weight of oxygen absorbed in either case is nearly the same.

Another chemist has found, by adopting Livache's method, that while older oils absorb from 15 to 16 per cent. of their weight of oxygen, younger oils absorb 17, 18, or even 19 per cent. He had never observed any oil that attained 20 per cent. These results show that the process of oxidation in drying oils must be regarded as a purely chemical one, and not as due to micro-organisms. Kissling's researches confirm fully this conclusion.

Varnish and Driers as Combustible

The rapidity with which the oxygen is absorbed is a more important factor in the production of heat than the amount. Varnishes and driers which contain linseed oil boiled with litharge or manganese oxide as their principal ingredient, with copal and turpentine, are roughly filtered while still warm, after having been just made through wadding in circular sieves, and the wadding has been known to ignite spontaneously after use.

The wads under experiment were drained, folded, and laid in a place exposed to the wind, but where no external heat could reach them. The temperature soon rose to 60 degrees C., and in 15 minutes to 138 degrees C. Then quantities of turpentine vapor were evolved. and inside the wad thick drops of oil clung to the thermometer. When the cooling effect of the outer air was prevented by an iron hood, the rise of temperature was accelerated, but without the hood 275 degrees was reached in less than three-quarters of an hour, and then, while volumes of unpleasantly smelling vapors were disengaged, the temperature suddenly went up to 300 degrees C., and the thermometer had to be removed lest it should break.

When the wad was carefully unfolded the inside was seen to be much charred, while the outside was quite intact and as white as at first. The charred parts, especially here the carbon was finely divided, began at once to glow, and in a few moments the wad was fully alight. The whole experiment lasted only an hour, and can easily be explained by supposing that the carbon set free by the oxidation of the organic matter is in a pyrophoric state, so that it is in a condition to catch fire on exposure to the atmosphere.

Experiments made with variously impregnated wads in a tube, both with and without access of heat and air, appear to show that spontaneous combustion can take place only when a sufficient amount of pyrophoric carbon has been set free by the rise of temperature, and comes into sufficiently free contact with the air.

Fatty oils and products made from them are specially important, too, in this connection. Fires have occurred in workshops, as I alluded to in the beginning, which have been attributed to the malice of certain workmen, but which very likely had their origin in spontaneous combustion.

A case in point is as follows: A vessel holding rosin varnish, the varnish containing red lead, having to be left over night, was covered over with sacks. A rapid rise of temperature took place, due no doubt to the action of the red lead in oxidizing the varnish. Fortunately the fire was discovered before any harm was done.

In all well conducted workshops where varnishing and oiling is done there are covered metallic vessels for throwing the oily textile stuffs used in rubbing or cleaning off varnish and oils in, and where this is not done workmen should be carefully instructed to see that such rags or waste is not allowed to lie around, but that it is placed where it can be destroyed in the furnace.

The case may be summed up as follows: All textile and porous articles soaked in oils, and oily products which can absorb oxygen, are liable to undergo rise of temperature. According to the greater or less amount of oxygen taken up, and to the greater or less amount of heat from other sources, the rise of temperature will be greater or less. If the rise is great enough to set free carbon in a pyrophoric condition, and if enough air gets to this carbon, spontaneous combustion will ensue.

Light in the Varnishing Room

It was once the fashion among vehicle painters to darken the room as soon as a job was varnished. If this were done in warm weather we could see a reason for it, for it would keep the flies off. But other than this we can see no valid reason. Chevreul, whose authority in such matters is generally recognized as beyond argument, clearly states in one of his treatises that sunlight—not direct sunlight—materially assists in the process of drying in the case of both oils and varnishes. One of his ablest disciples, M. Cloez, has studied with great care the action of the atmosphere upon oils. He deduces from the result of his work the following conclusions:

First. All fatty oils, without exception, absorb air and increase in weight in various degrees, according to their different kinds, when placed under the same conditions; and these degrees vary again for the same oil submitted to oxidation under different circumstances.

Second. Raising the temperature exercises a very great influence upon the rapidity of the oxidation.

Third. The intensity of the light has also a very manifest action upon the progress of the oxidation.

Fourth. Light transmitted by colored glasses retards, more or less, the resinification of the oils by the action of the oxygen of the air. Starting from colorless glass as a point of comparison, the retardation of the oxidation is in the following order: Colorless glass, blue, red, green and yellow.

Fifth. In the dark the oxidation is considerably retarded. In the first place, it does not begin for quite a while; and, when begun, proceeds much less rapidly than under the influence of light.

Sixth. The presence in the oil of various bodies, and the character of the surface upon which it is applied, may accelerate or retard, more or less, the oxidation.

Seventh. In the resinification of oils there is not only loss of carbon and hydrogen by the material, but assimilation of oxygen from the air.

Eighth. The various oils which oxidize by the air furnish in general the same products; gaseous and volatile acid compounds, fatty acids, either in their original liquid form or changed into solids, and another body, solid and insoluble, which appears to be a well defined immediate principle.

Ninth. Oils oxidized by the air contain no longer any glycerine.

Tenth. The drying oils have the same chemical composition as the non-siccative oils. They all contain the same immediate glycerine principles, but in different proportions.

If, then, these conclusions are correct, and we assume that they are, the varnisher will see how important a matter it is that the freshly laid coating of varnish has plenty of light and air in order to dry properly.

Sudden Cracking of Varnish

After the varnish has been on for a few days it shows signs of cracking. What is the cause of this? "Fault of the varnish," you will say. Not always. Take a cheap grade varnish, and apply it over a quick-drying foundation, and while the varnish will not crack soon, yet in time it will perish—turn white. One might expect it to crack very soon, but it may stand in the shop for some time without doing that. Take this same varnish and put it on an elastic foundation, and perhaps in a day or two it will begin to crack, doing this in any event before turning white and perishing. The reason is a low grade varnish is short and brittle, and has a better chance over a surface that is likewise hard and brittle than over one that is elastic.

Taking a high-grade oil varnish and placing it on a hard brittle surface, the chances are that the varnish will soon show cracks. In other words, if a varnish is to do its very best it must be laid on a surface as nearly like it in composition as possible. And the foundation must be perfectly dry. Remember that, for it is very important.

Sweating of Varnish

When the varnish salesman comes in contact with the buyer, about the first question he expects, and gets, is this: "Does your varnish sweat?" And promptly he is likely to respond, "No, it will not sweat." Now, as a matter of fact, no one ever saw a varnish that would not sweat under certain conditions. The fact that a varnish will sweat means that it still has life. A varnish that would not sweat is a dead varnish. Take a varnished surface, one that has been done a long time, and try it for sweating; if you rub it and find it sweats, as you will in many cases, it is a sign that sufficient moisture, or oil, is still in the varnish to give it proper elasticity, and that is good for some time yet of wear and tear.

Does the sweating of a rubbing coat injure the finishing coat over it? Yes, certainly, for the fact that it sweats shows that it is not dry enough; it is too soft.

Yet all varnishes sweat. Yes, but there are degrees of sweating, and the sweating of an old or well dried coat is not injurious to the finish; it is the soft and fresh coat that causes trouble.

Wrinkling of Varnish

Some call wrinkling "crinkling," and it is usually caused by a too heavy flow of varnish. The cause may in some cases be attributed to varnish that is too thin and new, and in this case, as indeed in all cases, it is better to buy that which is well ripened or aged. This is not so easy a matter, however, as some varnish-makers do not allow their product to stay long in the settling tanks, but rush it out as soon as possible. A varnish is very much better for age, and as standing in the tanks means capital tied up, increasing cost of output, many will not give the varnish as much time for settling as it should have. You may have noticed that while many brands of varnishes on the market have large claims made for their luster, or this, that and the other god thing, very seldom do you see it stated that the varnish has had a year, two years, or more age, standing in the tanks.

Finishing varnish particularly should be well aged. The cause of wrinkling may in some instances be due to the unripe varnish, as stated, but running and curtaining are usually due to faulty application. It is sometimes due to using a brush that is too soft and not elastic enough; with such a brush it is impossible to spread the varnish over the work properly, the varnish being left thick or thin in places, and these will overlap and run, trying to find a level, and the trouble will be greatest around corners and edges. The brush should be elastic enough to allow of the proper working of the varnish over the surface of the object being coated, and the varnish should be applied as quickly as possible, thus avoiding the setting of the same before it should, or before it has been properly spread out. A slow-drying and durable varnish is more liable to run and streak, containing a larger proportion of oil, than one that is harder-drying and heavier in body, and it will, therefore, as a rule, require more brushing up to prevent "curtains" or "festoons," as these laps or spots are sometimes called.

Improvement by Age

All varnishes deposit more or less settlings when left standing for a long time, and, for this reason, when, say seven-eighths of a can has been used, the remainder should be set away for some less particular purpose. Varnish will improve from age up to a certain point, but after this it will become fatty, often too fatty for use, but it never becomes seedy or sandy from age. Also, if kept in a perfectly airtight can the varnish will keep in perfect working condition for a very long time. But very often a can of varnish will not be hermetically sealed, though apparently it is, and hence the air gets to it and oxidizes it.

Wrinkling is sometimes called "puckering," though the latter is rather different, consisting of a series of puckered-up places, and is due to imperfect working of the varnish.

Effect of Sanding on the Finish

RECENTLY, while talking to the foreman finisher, I was observing the movements of the stainer, who was staining some mahogany panels that had fine carvings in the centre, says Wilfred Mack, in The Wood-Worker. The man was staining the carvings first, and setting them away to dry before staining the whole panel. On some of the carvings he put two and three coats of the stain before he thought they were right. The stain he put on the carvings he took from a small tin, while the stain for the whole panel was taken from a large vessel. From this I concluded that for some reason he was using a different stain on the carvings from that used on the whole panel.

Always being on the lookout for information regarding any phase of the wood-working industry, I asked the foreman the meaning of the stainer's method of staining, and he replied: "The panels are veneered with African stripe mahogany veneer, while the carvings are solid African mahogany. The veneer takes the stain darker than the solid wood, consequently we have to use a darker stain and put two or more coats on the latter, in order to produce an even color."

I picked up a panel and examined the carvings, then said to the foreman: "It is true that one is veneer and the other solid mahogany, but that difference is not sufficient to account for the difference in the effect produced by the stain. If you will give me a small piece of solid mahogany direct from the planer, I will show you what is the cause."

The foreman stepped inside his office and took from a number of pieces of wood that he had there for experimental purposes, one about 2-in. wide and 6-in. long, and handed it to me. One side of the piece had been sanded ready for finishing, while the other side was just as it left the jointer. I selected the side that had not been sanded, and, taking a piece of sandpaper, sanded half of it and handed it to the foreman, asking him to have it stained. He did so and we watched the result. From the moment the stain was first applied we could see there was a great difference between the part that was sanded and that which was not, the part that was not sanded being very much lighter in color than the other. A second and a third coat was applied, but it could not be made to look like the part that had been sanded.

"Now," I said, "the reason you have trouble with those carvings is because they have never been sanded. The man who carved them is an expert. With one sweep of his tool he would complete the circles, and when he was through, nothing more was required to make a perfect job, so far as his work went. But in all this the finisher had not been considered and the work was sent to the finishing room the way it left the carver's tool."

"But why would sanding produce such a great difference in the result after staining?" asked the stainer.

"The power of stain to produce depth of color depends largely, if not entirely, on its power to penetrate the wood. In proof if this, put a coat of the same stain on a piece of hard maple and a piece of basswood, and see how much deeper is the color on the latter. Now, the surface of these carvings is hard and smooth, coming, as they did, direct from the sharp tool. If we rub them with sandpaper, no matter how fine, it will loosen up some of the fibers and make it more absorbing. Let us sand one of the carvings and note the result there."

We did so, being careful to sand it just enough to ruffle the fiber a little and not to destroy in any way the perfect shape of the carving, and found that one coat of the regular stain all over produced an even color.

The finisher was thoughtful for a few moments, then he said: "From what I see here, it looks as though different depths of color may be produced by sanding the wood with different grades of sandpaper."

"That is quite true," I replied. "The coarser the paper the more fiber will be loosened and the deeper the depth of color."

"Then it is possible for the finisher to be blamed for having his stain off color, when in reality the fault is in the wood-working department using a different grade of paper than usual?"

"That is also quite true, and I have known it to happen on more than one occasion. I once knew a concern making oak bathroom wood work, a large quantity of which was finished golden. In the sanding department the work was all done on drums and different grades of paper were used; very coarse for the first sanding, and then finished with No. 00. On one occasion they ran out of the fine paper and a lot of goods were finished with No. ½, and sent to the finishing room without anything being said about it to the finisher. The stainers were put to work and the foreman was called to some other duties, and did not return until the goods were almost all stained. When he saw how dark the goods were he turned pale, because he knew they were expected to match goods then in stock, but that they would not do it.

"His first impression was that a mistake had been made in reducing the stain, but the stainer assured him that such was not the case. To make sure, the foreman prepared a new lot of stain, but the effect was the same. In desperation, he stopped all further operations until he could find the cause of the trouble. Among other things, it occurred to him that there might be a difference in the oak, and he began to examine some of the unstained pieces. Then for the first time he noticed they were not well sanded. He had some very fine paper and sanded a piece by hand, and then stained it. The effect of the fine sanding was marvellous. But I don't think the finisher was ever able to convince the manager that the fault of the off color was not his—at least the latter never gave in that he was convinced."

If the finisher is expected to produce a finish of uniform quality and color, he should at least be given a uniform class of goods to do it on.

For a glue useful for uniting glass to wood add some sifted wood ashes to the glue while hot and use at once. Glue may be made harder by adding some finely powdered brick dust. For mending glass make a glue by dissolving the very finest glue in acetic acid, making it into a thin liquid.

A combination wood-worker will not take the place of a regular planing mill or of special machines for certain work, where there is enough of the work to justify, but it often helps out wonderfully in doing odd jobs, as well as fills quite a place with the contractor.

One of the essentials in modern mill and factory equipment is a good locker for every man employed. These lockers should not all be grouped in one place, but should be distributed to make for convenience and to save time and steps.

Trade Happenings and Opportunities

Woodworking News from Coast to Coast

Geo. Ingle, planing mill owner, Lindsay, Ont., died recently.

The Montreal Planing Mills Company, of Montreal, have dissolved.

The Medicine Hat Planing Mills, Limited, are now in full operation.

P. Cliche, Lake Megantic, P.Q., has commenced the erection of a broom factory.

Daniel Senecal has commenced the erection of a box and basket factory at Wyoming, Ont.

Bell & Glover, cabinet makers, Vancouver, B.C., have been succeeded by Glover & Dawson.

A planing mill at Rossland, B.C., owned by Mr. Deschamp, was destroyed in a storm last month.

The sash and door factory of F. Tremblay & Company, Montreal, was recently burned. It was insured.

Dyment and Mickle are considering plans for the erection of a sash and door factory at Fenelon Falls, Ont.

Sommers Bros., Saginaw, Mich., are considering plans for the erection of a match factory to cost $30,000 at Sarnia, Ont.

The Owen Sound Furniture Company, Limited, has changed its style to that of The Owen Sound Chair Company, Limited.

The Fort Qu'Appelle Boat Building and Wood Manufacturing Company, of Fort Qu'Appelle, Sask., is building a $50,000 factory.

Building operations on the new broom factory at Lake Megantic, Que., are about completed and the machinery will shortly be installed.

The Hanbury Manufacturing Company, of Brandon, Man., who manufacture office furniture and fixtures, propose to extend their plant.

Pelletier & Gariépy, sash and door manufacturers, Montreal, have been registered. The members are Mathais Gariepy and Victor Pelletier.

The capital stock of the Gibbard Furniture Company of Napanee, Limited, has been increased from thirty thousand to two hundred thousand dollars.

The Bishop's Crossing Sash & Door Factory Company, Limited, has been organized with a capital of $49,000. They will build at Bishop's Crossing, Que.

Mathias Gariepy and Victor Pelletier have registered under the style of Pelletier & Gariepy. They will conduct a sash and door factory at Montreal.

The B. F. Sturtevant Company of Canada, Limited, Canadian representative of the well-known Boston firm, has obtained a provincial license for Ontario.

Mr. Daniel Senecal will build a box and basket factory at Wyoming, Ont. It will be of one-storey and white brick construction. The municipality have granted a bonus.

The planing mill at Chesley, Ont., owned by Messrs. Lueck Bros. & Elliott, was gutted by fire on September 29th when a quantity of valuable machinery was destroyed.

A woodworking and cabinet-making industry has been started at Coquitlam, B.C., by L. W. Hookam, who for five years was designer with Woodcrafts, Limited, of Calgary.

The Rhodes Curry Company, Amherst, N.S., are well advanced with the construction of their new woodworking factory at Halifax. The building is two storeys, 50 ft. x 170 ft.

In consideration of the recent grant of a fixed assessment of $20,000 by the Corporation of Goderich, Ont., to the Goderich Organ Company, Limited, of that place, the latter will extend their factory.

The Northern Veneer Company who are erecting a plant at St. Catharines, Ont., expect to have a basket factory in operation early in December. Mr. H. Dalton, of Grimsby, Ont., is president of the firm.

The Gull Lake Lumber Company, Limited, has been incorporated with a capital of $100,000 and they will carry on business as lumber manufacturers and dealers in wood products. Their head office will be at Gravenhurst, Ont.

The Central Contracting Company, Limited, is the name of a firm recently incorporated with a capital of $50,000. Their head office will be at Fort William, Ont., and they will conduct a lumbering, saw mill and woodworking business.

The Fern Consolidated Company has been organized with an authorized capital stock of $1,000,000. The head office will be at Three Rivers and the company's charter permits of their engaging in furniture making and sash and door manufacturing.

A by-law was passed in Forest, Ont., recently, granting the Forest Basket Company exemption from taxation for ten years. In consideration of this the company will build an addition to their factory which will double its capacity and will employ 100 persons.

To the British steamer Algoa belongs the credit of having moved the largest cargo of lumber ever set afloat on the Pacific coast. It comprised 2,100,000 feet of redwood loaded at Humboldt Bay and 4,000,000 feet of Oregon pine taken on at Columbia River Hills.

The Vancouver Box Company, Limited, has been incorporated, with head office at Vancouver, B.C., and capital stock of $100,000 to take over the box manufacturing business recently acquired by A. Y. Johnstone from the British Columbia Box Company, Limited.

The Pointe Claire Sash and Door Company, Limited, has been incorporated with head offices at Pointe Claire, P.Q., and capital stock of $49,000. The incorporators are A. Lesage, Z. Mitchell, J. A. E. Descelles, L. Charlebois and A. Desparois of Pointe Claire, P.Q.

The Parry Sound Basket and Veneer Company, Limited, has been incorporated with a capital of sixty thousand dollars. The head office of the company will be at Stoney Creek, Ont. They will engage in the manufacture of baskets, crates, cooperage supplies, wagon wheels, etc.

The last of the machinery has been installed in the plant of the Colonial Sash & Door Company at Huntingdon, B.C. Most of the stock of the concern is held by the officers and directors of the American Lumber Company, Sumas, Wash., and the Electric Planing Mill Company, Huntingdon.

The T. Heal Woodworking Company, Limited, has been incorporated with a capital of $400,000, to carry on business as contractors, carpenters, woodworkers, etc., with head office at Toronto. The provisional directors are W. J. Mitchell, W. S. Thomas, and Ernest Constant, brokers, all of Toronto.

D. C. Patmore, architect, of Spokane, Wash., is superintending the erection of a new planing mill for the Crow's Nest Pass Lumber Company, Limited, Wardner, replacing the structure destroyed by fire about two months ago. The

new mill will embody a number of improvements in the way of equipment.

An interesting presentation of a club bag and brushes was made at Owen Sound recently by the employees of the North American Furniture Factory, when the superintendent, Mr. K. K. White, severed his connection with the firm after an extended and successful connection with it. The presentation was accompanied by an address in which a tribute was paid to Mr. White's rare ability in securing from employees good work without the undue exercise of official authority. The signatories were Mr. J. McMurray, D. Lusk, Wm. Gilchrist and S. Kirkland.

Baxter D. Whitney & Son, woodworking machinery manufacturers, Winchendon, Mass., have transferred their Pacific Coast sales office to the offices of the Stetson-Ross Machine Works, Whatcom Avenue, Seattle, Washington, with whom they are associated. They will continue to handle the line of machines made by the Morgan Machine Company, Wilkin-Challoner Company, Newman Machine Company, Wysong & Miles Company, Coe Manufacturing Company, Falls Machine Company, McDonough Manufacturing Company, and the Kelley Electric Machine Company. Baxter D. Whitney & Son have also established an office in Berkeley, Cal., in charge of H. H. Plummer.

The James T. Gilchrist Lumber Company, Limited, was recently incorporated at Toronto with a capital $40,000. This company have purchased the wood-turning business and planing mill of W. Spanner & Company at Bloor Street and Gladstone Avenue. Mr. James T. Gilchrist is the president and managing director of the new company and Messrs. A. Winchester and A. Brody are provisional directors. Mr. J. T. Gilchrist has been for the past twenty-five years with Mr. J. C. Gilchrist at his planing mill on Ernest Avenue, and is consequently very well known to the trade in Toronto. With his long experience in the planing mill business there is no doubt that he will be successful in his new venture.

New and Second-Hand Machinery

The Chicago Machinery Exchange, Inc., are desirous of directing the attention of the Canadian trade to their many excellent lines of new and rebuilt woodworking machinery. This firm occupies a leading position on the other side of the border. In their fifty-two lines of new machinery they claim to have the largest stock in the world, while they have more than one thousand second-hand machines, the working parts of which have been renewed and which are guaranteed to give excellent service. The second-hand machines are accepted occasionally as part payment for machines of similar type. Where a machine is worth while the parts are thoroughly inspected. Such as need replacing are then furnished. The spindles may need re-balancing or the boxes re-babbitting. Unless a machine can be rebuilt for good service it is condemned. By following this policy the Chicago Machinery Exchange, during the fourteen years that they have been in business, have gained an established reputation in this field. A list of new and rebuilt woodworking machinery can be obtained by any reader of the Canadian Woodworker by dropping the firm a line, mentioning this paper.

Book Reviews

"Wood and Forest" is the title of an interesting book by William Noyes, received from the Manual Arts Press, Peoria, Ill. This book has been compared as a companion volume to the author's "Handwork in Wood." It essays to collect and arrange in available form useful information about the sources, growth, properties and use of our common woods. It is of interest to note in the fore-word the author's acknowledgement that the successful completion of the book is due to the co-operation of his wife in the making of the drawings and the maps and the correction of the text and proofs. The contents are excellently arranged and the dozens of illustrations are presented to advantage on the heavy, coated stock. In the space allotted to this review the enumeration of the contents only is possible. The chapters are devoted to, 1, The Structure of Wood; 2, Properties of Wood; 3, The Principal Species of American Woods; 4, The Distribution and Composition of the North American Forests; 5, The Forest Organism; 6, Natural Enemies of the Forest; 7, The Exhaustion of the Forest; 8, The Use of the Forest. The book is attractively bound in a cloth cover and contains upward of three hundred pages.

The Late D. A. Ross

News of the death of Mr. D. A. Ross, of the Ross-Taylor Company, Exeter, Ont., which occurred on October 6th at Clinton, Ont., has been received with widespread regret by the woodworking industries through the province. The late Mr. Ross has been in business in Exeter for the last thirty-five years, having been associated with Mr. Taylor until the

The late D. A. Ross, pioneer woodworker of Exeter, Ont.

formation of the Ross-Taylor Company ten years ago, when he became Secretary-Treasurer of that concern. A native of Pictou, N.S., Mr. Ross left the Maritime Provinces at the age of nineteen and spent some years in Boston, Mass., after which he became connected with the Exeter business and had much to do with the upbuilding of one of the most successful woodworking industries in that section of the country. The Ross-Taylor Company, with which Mr. Ross was connected, are well-known as operators of saw and planing mills and as manufacturers of lumber, sash, doors and other products.

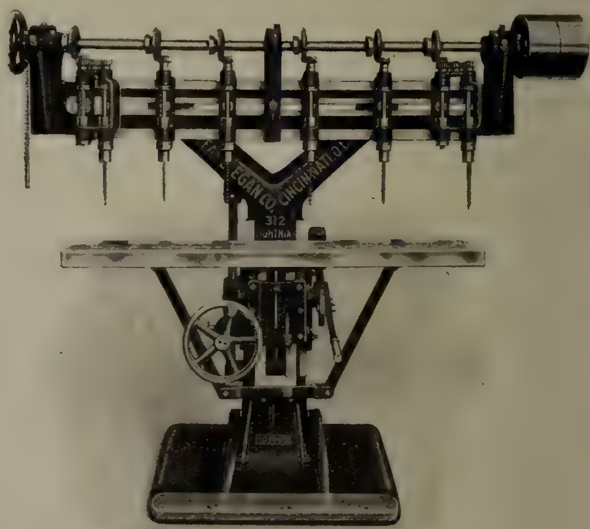
A good scheme reported for checking up on estimates and making the estimator careful in his work, is to make estimate blanks in duplicate on the back side of the sheet. One is marked "Original Estimate," the other "Pan Out." As the work is finished and the cost items tabulated, they are entered on this reverse side and are instantly comparable at all times with the estimator's original figures. This makes it easy to see how the estimate works out, and is said to be sure to make the estimator careful.

A Multiple Spindle Borer

To be able to bore a number of holes at one operation has long been the ambition of furniture manufacturers and others engaged in work requiring the constant use of a boring machine. Yet they hoped for little encouragement along this line, as their work called for holes varying in size, both in straight and staggered lines, and it seemed almost impossible to construct a machine for doing this class of work.

But now there is a machine that will bore as many as twenty holes of different sizes, either in a straight line or staggered, in the time usually taken to mark off and bore one hole. All holes are bored at one stroke of the table, every piece being an exact duplicate of all others, and there is no marking or laying off required. This is a modern, high-efficiency tool which will greatly reduce the cost of doing this class of work. All adjustments on this machine are made from the front.

It is made with saddle from 20 in. to 60 in. centers, with as many plain or radial spindle gates as ordered. The illustration shows a 60 in. machine with four plain and two single radial spindles. The spindles are carried in single, double or radial clusters in practically unlimited variety, to suit any particular class of work, as ordered. The single spindles



Multiple Spindle Borer manufactured by J. A. Fay & Egan Company, Cincinnati.

are driven through phosphor bronze bevel gears, cut from the solid, eliminating troublesome belting, hot journals and noise. The extra gears on the radial gates are steel and are also cut from the solid. A self-centering locking device locks each gear in position on the shaft. The radial gates are locked in any position by a self-locking device. The bearings are of phosphor bronze with ball-bearing end thrust and continuous oil flow.

The manufacturers are Messrs. J. A. Fay & Egan Company, 153-173 West Front Street, Cincinnati, Ohio.

Strange, Isn't It?

That one can show his temper only after he has lost it?

That a contractor should be called upon to expand a house?

That no young man ever rose rapidly till he had settled down?

That a susceptible fellow is hardest hit by the softest glances?

That so many students cannot state bald facts without splitting hairs?

That the straighter a man drinks his whisky the crookeder he walks home?

BOOKS For Sale

The following books are offered at special prices subject to previous sale:

A Practical Treatise on the Steel Square, by Fred T. Hodgson, Published by Frederick J. Drake & Company, Chicago. Price 50c. each.

Common-sense Handrailing, by Fred T. Hodgson. Published by Frederick J. Drake & Company, Chicago. 114 pages, illustrated. Price 50c.

Plank Frame Barn Construction, by John L. Shawyer. Published by David Williams Company, New York. 34 pages, illustrated. Price 50c.

Roof Framing Made Easy, by Owen B. Maginnis, Published by The Industrial Publication Company, New York. 164 pages, illustrated. Price 50c.

Handrailing Simplified, by An Experienced Architect. Published by William T. Comstock, New York. 52 pages, illustrated. Price 50c.

Architects' and Engineers' Hand-Book of Reinforced Concrete Construction, by L. J. Mensch. Published by the Cement & Engineering News, Chicago, Ill. 216 pages, illustrated. Price 50c.

Practical Centering, by Owen B. Maginnis. Published by William T. Comstock, New York. 80 pages, illustrated. Price 50c.

Richey's Guide and Assistant, by H. G. Richey. Published by William T. Comstock, New York. 176 pages, illustrated. Price 50c.

How to Join Mouldings; or, The Arts of Mitering and Coping, by Owen B. Maginnis. Published by William T. Comstock, New York. 72 pages, illustrated. Price 50c.

The Book of Lumber Shed Construction, by Met. L. Saley. Published by American Lumberman, Chicago. 176 pages, illustrated. Price $1.00.

Wallpapers and Wall Coverings, by Arthur Seymour Jennings. Published by William T. Comstock, New York. 160 pages, illustrated. Price 50c.

Woodworking Safeguards, by David Van Schaack. Published by AEtna Life Insurance Company, Hartford, Conn. 216 pages, illustrated. Price 50c.

Furniture Designing and Draughting, by Alvan Crocker Nye. Published by William T. Comstock, New York. 100 pages, illustrated. Price $1.00.

Steam Power Plants—Their Design and Construction, by Henry C. Meyer. Published by McGraw Publishing Company, New York. 158 pages, illustrated. Price 50c.

Popular Mechanics Shop Notes, Published by Popular Mechanics, Chicago. Easy Ways to do Hard Things, etc. Years 1905-1906-1907-1908-1909. Price 40c each.

Cabinet Making, by J. H. Rudd. Published by Grand Rapids Furniture Record Company. 210 pages, illustrated. Price $1.50.

Modern Practical Carpentry, by George Ellis. Published by B. T. Batsford, London. 378 pages, illustrated. Price $1.50.

Woodworker Publishing Company, Limited

Nicholls Building

Toronto, - Ontario

BUYER'S DIRECTORY

AUTOMATIC DOVETAIL GLUE JOINTER
Canadian Linderman Machine Co., Ltd., Woodstock, Ont.

AUTOMATIC GLUE CLAMP CARRIER
Nels J. Billstrom, 1315 Tenth street, Rockford, Ill.

BABBITT METALS
Shurly Dietrich Co., Ltd., Galt, Ont.
Fay & Egan Co., Cincinnati, O.
Canada Metal Co., Ltd., Toronto.

BALUSTER LATHES
C. Mattison Machine Works, Beliot, Wis.
Thos. White & Sons, Paisley, Scotland.
Chicago Machinery Exchange, Chicago, Ill.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.
Canada Machinery Corp., Ltd., Galt, Ont.

BAND SAW FILING MACHINERY
Shurly Dietrich Co., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

BAND SAWS
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Shurly Dietrich Co., Ltd., Galt, Ont.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
R. H. Smith Co., Ltd., St. Catharines, Ont.

BAND SAW MACHINERY
American Woodworking Machinery Company, Rochester, N.Y.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
Williams Machinery Co., A. R., Toronto.

BAND SAW MILLS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., Cincinnati, Ohio.

BAND SAW STRETCHERS
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

BENDING MACHINES
American Woodworking Machinery Company, Rochester, N.Y.
Fay & Egan Co., Cincinnati, Ohio.

BELTING
J. A. Fay & Egan Co., Cincinnati, Ohio.
Sadler & Haworth, Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
H. W. Petrie, Ltd., Toronto.

BELTS (Endless)
Candada Machinery Agency, Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Sadler & Haworth, Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

BELT CEMENT
Sadler & Haworth, Montreal.

BELT FASTENERS
Sadler & Haworth, Montreal.

BELT DRESSING
Sadler & Haworth, Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

BLOWERS
Cyclone Blow Pipe Co., Chicago.
Ormsby, Limited, A. B., Toronto.
Sheldons Limited, Galt, Ont.
U. S. Steel Tank & Pipe Co., Chicago.

BLOW PIPING
Cyclone Blow Pipe Company.
Ormsby, Limited, A. B., Toronto.
Sheldons Limited, Galt, Ont.
U. S. Steel Tank & Pipe Co., Chicago.

BOILERS
Canada Machinery Agency, Montreal.

BORING MACHINES
American Woodworking Machinery Company, Rochester, N.Y.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Mussens, Limited, Montreal.
J. M. Nash, Milwaukee, Wis.
Valley City Machine Works, Grand Rapids. Mich.
Williams Machinery Company, A. R., Toronto.

BOX MAKERS' MACHINERY
American Woodworking Machinery Company, Rochester, N.Y.
Canadian Linderman Co., Ltd.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.

CABINET PLANERS
Canada Machinery Corporation, Ltd., Galt, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Agency, Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Valley City Machine Works, Grand Rapids, Mich.
Baxter D. Whitney & Son, Wichendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Ltd., Toronto.
Williams Machinery Co., A. R., Toronto.

CARS (transfer)
Sheldons Limited, Galt, Ont.

CARVING MACHINES
American Woodworking Machinery Company, Rochester, N.Y.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Hespeler Machinery Co., Ltd., Hespeler, Ont.
Valley City Machine Works, Grand Rapids, Mich.

CHISELS
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

CIRCULAR SAW MILLS
Canada Machinery Agency, Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.

CHAINS (Silent)
Jones & Glassco, Montreal

CLAMPS (Chain, Carpenter, Cabinet, Pattern Makers, Bench, Mitre, Piling, Mounted and Rotary Wheel)
Adjustable Clamp Company, Chicago.
Batavia Clamp Company, Batavia, N.Y.
Black Bros. Machinery Company, Mendota, Ill.
Batavia Clamp Company, Batavia, N.Y.
Black Bros. Machinery Co., Mindota, Ill.
J. A. Fay & Egan Co., Cincinnati, Ont.

CLAMPS (Saw)
Adjustable Clamp Company, Chicago.
Batavia Clamp Co., Batavia, N.Y.
Black Bros. Machinery Company, Mendota, Ill.
Shurly Dietrich Co., Ltd., Galt, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

CLUTCHES
J. A. Fay & Egan Co., Cincinnati, Ohio.

COLUMN CLAMPS
Black Bros. Machinery Co., Mendota, Ill.

COLUMN MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.

CORE BOX MACHINES
J. A. Fay & Egan Co., Cincinnati, Ohio.
Chicago Machinery Exchange, Chicago, Ill.
E. & B. Holmes Machinery Co., Buffalo, N.Y.

CUT-OFF SAWS
Canada Machinery Corporation Ltd., Galt, Ont.
Shurly Dietrich Co., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Berlin Machine Works, Ltd., Hamilton, Ont.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

CUTTER HEADS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Lamson Cutter Head Company.
Samuel J. Shimer & Sons, Galt, Ontario.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.

DADO HEADS
C. Mattison Machine Works, Beloit, Wis.
Fox Machine Company, Grand Rapids, Mich.
W. A. Elliott, Bathurst and College Sts., Toronto.

DIEMAKERS & MACHINISTS
W. H. Dunne, 1492 Queen St. West, Toronto.

DISK GRINDERS
J. A. Fay & Egan Co., Cincinnati, Ohio.

DOGS (Saw Mill)
J. A. Fay & Egan Co., Cincinnati, Ohio.

DOVETAILING MACHINES
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canadian Linderman Machine Co., Ltd., Woodstock, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

DOWEL MACHINES
American Woodworking Machinery Company, Rochester, N.Y.
Thos. White & Sons, Paisley, Scotland.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Dauber-Bell Machine Company.
J .A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Valley City Machine Works, Grand Rapids, Mich.

DRYING MACHINERY
Morton Dry Kiln Co., Chicago, Ill.
Sheldons Limited, Galt, Ont.

DRY KILNS
Morton Dry Kiln Company, Chicago, Ill.
Sheldons Limited, Galt, Ont.

DUST COLLECTORS
Ormsby, Limited, A. B., Toronto.
Cyclone Blow Pipe Company, Chicago.
Sheldons Limited, Galt, Ont.
U. S. Steel Tank & Pipe Company, Chicago.

DUST SEPARATORS
Sheldons, Limited, Galt, Ont.

EDGERS (Gang)
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machinery Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.
Williams Machinery Company, A. R., Toronto.

EDGERS (Single Saw)
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Agency, Montreal.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

END MATCHING MACHINE

American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

ENGINES (Steam)

H. W. Petrie, Limited, Toronto.

EXHAUST FANS

Cyclone Blow Pipe Company, Chicago.
Sheldons, Limited, Galt, Ont.
U. S. Steel Tank & Pipe Co., Chicago.

FLOORING MACHINES

American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corporation, Ltd., Galt, Ont.
Baxter D. Whitney & Son, Winchendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.

FLINT

Wausau Quartz Co., Wausau.

FLUTING HEADS

J. A. Fay & Egan Co., Cincinnati, Ohio.

FLUTING AND TWIST MACHINE

Pryibil Machine Co., P., New York.

GAINING MACHINES

Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Canada Machinery Corporation, Ltd., Galt, Ont.
H. W. Petrie, Limited, Toronto.
Williams Machinery Co., A. R., Toronto.

GAS ENGINES

H. W. Petrie, Limited, Toronto.

GAUGES (Saw)

Shurly Dietrich Co., Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver B. C.

GLUE

Perkins Glue Company.

GLUE CLAMPS

Adjustable Clamp Company, Chicago.
Batavia Clamp Company, Batavia, N.Y.
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.

GLUE HEATERS

J. A. Fay & Egan Co., Cincinnati, Ohio.

GLUE JOINTERS

American Woodworking Machinery Company, Rochester, N.Y.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canadian Linderman Company, Limited, Woodstock, Ont.
Chicago Machinery Exchange, Chicago, Ill.

GLUE SPREADERS

Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

GRINDERS (Cutter)

J. A. Fay & Egan Co., Cincinnati, Ohio.

GRINDERS (Knife, etc.)

Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.

GRINDERS (Tool)

J. A. Fay & Egan Co., Cincinnati, Ohio.
Valley City Machine Works, Grand Rapids, Mich.

GROOVING HEADS

J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Samuel J. Shimer & Sons, Milton, Pa.
Canada Machinery Corporation, Ltd., Galt, Ont.

GUARDS (SAW)

Porter Machinery Co., C. O., Grand Rapids, Mich.

HAND PROTECTORS

Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Jones Safety Device Co., Hamilton, Ont.

HARDWARE SPECIALTIES

Reflector & Hardware Mfg. Co., Chicago.

HAND SCREWS

Black Bros. Machinery Co., Mendota, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

HANDLE AND SPOKE MACHINERY

Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
J. M. Nash, Milwaukee, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.

HUB MACHINERY

Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

HYDRAULIC VENEER PRESSES

Wm. R. Perrin & Co., Ltd., Toronto.

INJECTORS

H. W. Petrie, Limited, Toronto.

JOINTERS

American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canadian Linderman Co., Ltd., Woodstock, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Plessisville Foundry, Plessisville, Que.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

KNIVES (Planers and Others)

Shurly Dietrich Co., Ltd., Galt, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Samuel J. Shimer & Sons, Milton, Pa.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
H. W. Petrie, Limited, Toronto.

LACE LEATHER

Sadler & Haworth, Montreal.

LATHES (Pattern Makers')

American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Valley City Machine Works, Grand Rapids, Mich.
Thos. White & Sons, Paisley, Scotland.

LATHES (Turning)

American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Valley City Machine Works, Grand Rapids, Mich.
Baxter D. Whitney & Son, Winchendon, Mass.
H. W. Petrie, Limited, Toronto.

LOOSE PULLEYS

J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corporation, Ltd., Galt, Ont.

LUBRICANTS AND GREASES

The A. J. Burton Saw Co., Ltd., Vancouver, B.C.

LUMBER

Anderson Lumber Company, C. G.

MACHINE KNIVES

Walters & Sons, H., Hull, Que.

MITRE MACHINES

Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N. Y.
H. W. Petrie, Limited, Toronto.

MITRE SAWS

Shurly Dietrich Co., Ltd., Galt, Ont.
E. C. Atkins & Co., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corporation, Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

MITRE CLAMPS

Adjustable Clamp Company, Chicago.
Batavia Clamp Company, Batavia, N.Y.
Black Bros. Machinery Co., Mendota, Ill.

MORTISING MACHINES

American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Jones & Glassco, Montreal.
Valley City Machine Works, Grand Rapids, Mich.
H. W. Petrie, Limited, Toronto.

MULTIPLE BOXING MACHINES

J. A. Fay & Egan Co., Cincinnati, Ohio.
J. M. Nash, Milwaukee, Wis.

PACKINGS

Both Felt Company

PAINTS AND VARNISHES

Jamieson & Co., R. C., Montreal.

PATENT SOLICITORS

H. J. S. Dennison.

PATTERN SHOP MACHINES

Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.

PICTURE FRAME MACHINERY

Black Bros. Machinery Co., Mendota, Ill.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.

PLANERS

American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.
Porter Mach. Co., C. O., Grand Rapids, Mich.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

PLANING MILL MACHINERY

American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Chicago Machinery Exchange, Chicago, Ill.
C. Mattison Machine Works, Beloit, Wis.
Pryibil Machine Co., P., New York, N.Y.
Samuel J. Shimer & Sons, Milton, Pa.
Baxter D. Whitney & Son, Winchendon, Mass.
Black Bros. Machinery Co., Mendota, Ill.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
Williams Machinery Co., A. R., Toronto.

POLISHING MATERIAL

Gray & Company, H.

PULLEYS

Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

RESAWS

American Woodworking Machinery Company, Rochester, N.Y.
Shurly Dietrich Co., Ltd., Galt, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
H. W. Petrie, Limited, Toronto
Williams Machinery Co., A.R., Toronto.

RIM AND FELLOE MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corp., Ltd., Galt, Ont.

RIP SAWING MACHINES
American Woodworking Machinery Company, Rochester, N.Y.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Canada Machinery Corp., Ltd., Galt, Ont.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
Williams Machinery Co., A. R., Toronto.

SAFETY GUARDS (For Band Saw Machines, Jointers, Rip Sawing Machines, Shapers, Swing Saws, etc.)
Chicago Machinery Exchange, Chicago, Ill.
Fair Manufacturing Company, Racine, Wis.
Jones Safety Device Co., Hamilton, Ont.
Porter Mach. Co., C. O., Grand Rapids, Mich.

SANDERS
American Woodworking Machinery Company, Rochester, N.Y.
Black Bros. Machinery Co., Mendota, Ill.
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
J. M. Nash, Milwaukee, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Fisher Sander Co., Berlin, Ont.
Elliot Woodworker Co., Toronto.

SANDPAPER
Black Bros. Machinery Co., Mendota, Ill.

SANDERS (Moulding, Belt and Panel)
Black Bros. Machinery Co., Mendota, Ill.
Chicago Machinery Exchange, Chicago, Ill.
H. W. Petrie, Ltd., Toronto.

SASH, DOOR INTERIOR TRIM AND COLUMNS
M. Brennan & Sons, Hamilton, Ont.

SASH, DOOR AND BLIND MACHINERY
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Samuel J. Shimer & Sons, Milton, Pa.
Black Bros. Machinery Co., Mendota, Ill.
Williams Machinery Co., A. R., Toronto.

SAWS (Hand)
Shurly Dietrich Co., Ltd., Galt, Ont.
E. C. Atkins & Co., Hamilton, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

SAW MILL MACHINERY
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Williams Machinery Co., A. R., Toronto.

SAW SWAGES, AUTOMATIC FILERS
E. C. Atkins & Co., Hamilton, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.

SAW TABLES
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Berlin Machine Works, Ltd., Hamilton, Ont.

J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N.Y.

SCRAPING MACHINES
American Woodworking Machinery Company, Rochester, N.Y.
Baxter D. Whitney & Son, Winchendon, Mass.
Chicago Machinery Exchange, Chicago, Ill.

SCROLL SAWS
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Shurly Dietrich Co., Ltd., Galt, Ont.
E. C. Atkins & Co., Hamilton, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.

SECOND HAND MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
H. W. Petrie, Limited, Toronto.
Williams Machinery Co., A. R., Toronto.

SHAPERS
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Samuel J. Shimer & Sons, Milton, Pa.
Baxter D. Whitney & Son, Winchendon, Mass.
H. W. Petrie, Limited, Toronto.

SHAVING COLLECTORS
Ormsby Company, A. B., Toronto.
Sheldons, Limited, Galt, Ont.

SINGLE SPINDLE BOXING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.

STAVE SAWING MACHINE
Baxter D. Whitney & Son, Winchendon, Mass.

STORE FIXTURES AND FITTINGS
Reflector & Hardware Specialty Mfg. Co. Chicago, Ill.

SURFACERS
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.
Chicago Machinery Exchangefi, Chicago, Ill.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.
Williams Machinery Co., A. R., Toronto.

SWING SAWS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.

TABLE LEG LATHES
Berlin Machine Works, Ltd., Hamilton ,Ont.
Chicago Machinery Exchange, Chicago, Ill.
Thos. White & Sons, Paisley, Scotland.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.

TENONING MACHINES
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Williams Machinery Co., A. R., Toronto.

TOOLS (Hand)
J. A. Fay & Egan Co., Cincinnati, Ohio.
Samuel J. Shimer & Sons, Milton, Pa.

TRIMMERS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

TRUCKS
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Sheldons, Limited, Galt, Ont.

TURNING MACHINES
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.
H. W. Petrie, Limited, Toronto.

UNDER-CUT SELF-FEEDING FACE PLANER
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.

GUMMERS, ETC.
E. C. Atkins & Co., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

UNIVERSAL WOODWORKER PLANER
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
W. A. Elliot, Bathurst St., Toronto, Ont.
H. W. Petrie, Limited, Toronto.

VARNISHES
Jamieson & Company, R. C.

VENTILATING APPARATUS
Sheldons, Limited, Galt, Ont.

VENEER DIERS
Sheldons, Limited, Galt, Ont.

VENEER PRESSES (Hand and Power)
Hydraulic Press Mfg. Co., Mount Gilead, Ohio.
Black Bros. Machinery Co., Mendota, Ill.
William R. Perrin & Company, Toronto, Ont.

VISES (Band Saws)
Shurly Dietrich Co., Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.

VISES (Pattern Makers')
J. A. Fay & Egan Co., Cincinnati, Ohio.

VISES (Circular Saws)
E. C. Atkins Co., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.

WAGON AND CARRIAGE MACHINERY
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.

WASHERS
Booth Felt Company

WASTE, COTTON
Gray & Company, H.

WIPING MATERIAL
Gray & Company, H.

WINDOW FRAME MACHINERY
Smith & Phillips Mfg. Co., Chicago, Ill.

WOOD PULLEYS
Canada Machinery Agency, Montreal.
Williams Machinery Co., A. R., Toronto.

WORK BENCHES
Canada Machinery Agency, Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio

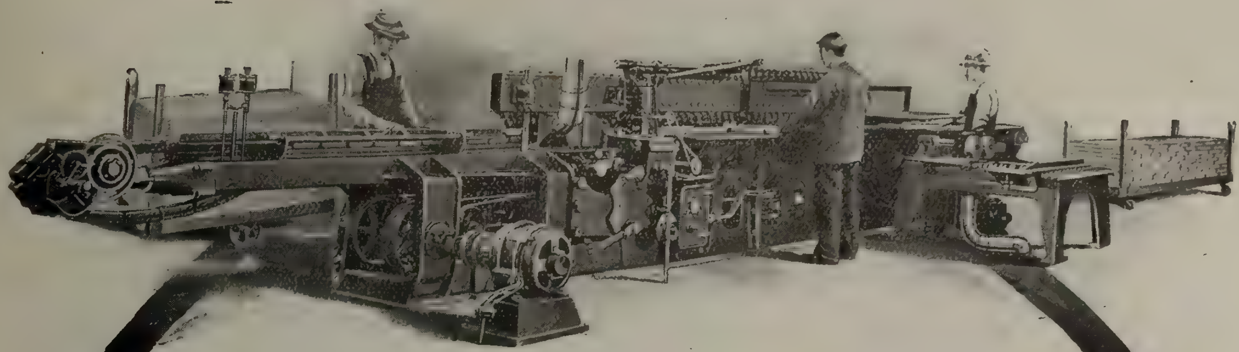
WOOD SCREWS
P. L. Robertson & Company.

Volume Thirteen TORONTO, NOVEMBER, 1913 Number eleven

Canadian Woodworker

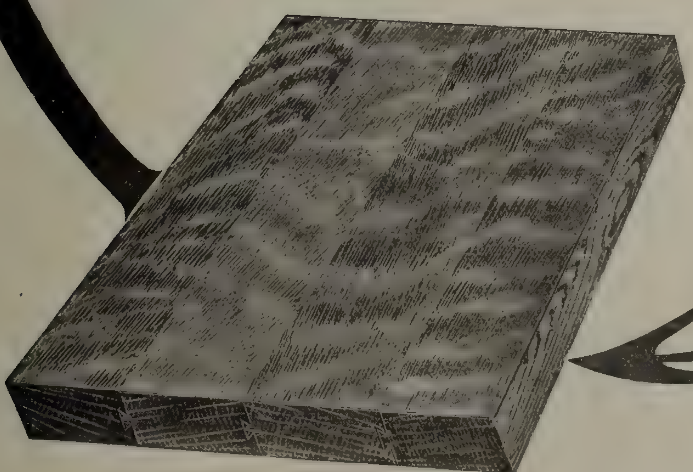
Alphabetical List of Advertisers, page 53

The Keynote of Efficiency in Jointing Lumber



GETTING along nicely and getting the utmost from your jointing department are two points that are a considerable distance apart when profit and efficiency are concerned. If you use more than one machine to make your panels to the exact width your factory has not struck the exact keynote of efficiency in lumber jointing, you have not reached that point of economy, the saving of time, labor, lumber and glue that hundreds of furniture manufacturers in Canada and the United States are deriving from jointing lumber by one automatic operation on the

LINDERMAN AUTOMATIC DOVETAIL GLUE JOINTER



Canadian Linderman Machine Co.

Works at: WOODSTOCK, ONT. MUSKEGON, MICH.

Two Machines For the Price of One

The "Hoosier"

Combined Power and Hand Feed

Rip Saw

Front View of Combined Machine

For single, gang or bevel ripping of stock up to 6 inches in thickness and 17½ inches wide—any length from 6 inches up.

The only practical Combination Hand Feed and Power Feed Rip Saw made in the world.

A MONEY-MAKING UTILITY MACHINE

The "Hoosier" Combination Hand Feed & Power Feed Rip Saw is the first machine of its kind to be placed on the market.

Formerly users were compelled to purchase two machines to accomplish the work that this one machine does. Customers had to buy a hand feed rip saw at a price of $75.00 to $100.00 and a power feed rip saw at a price of $175.00 to $250.00. The new combination machine does the work of both and saves purchaser at least $100.00. The hand feed enables the operator to closely follow the grain of the wood and when bad spots are encountered to cut around them, with the least waste of material. The power feed enables the operator to use the machine for single, gang and bevel ripping and machine will rip as thick as 6-in., as wide as 17½-in. and the feed is strong enough to pull six saws through 1-in. stock when gang ripping. Machine can be used for resawing stock such as weather boarding up to 6-in.

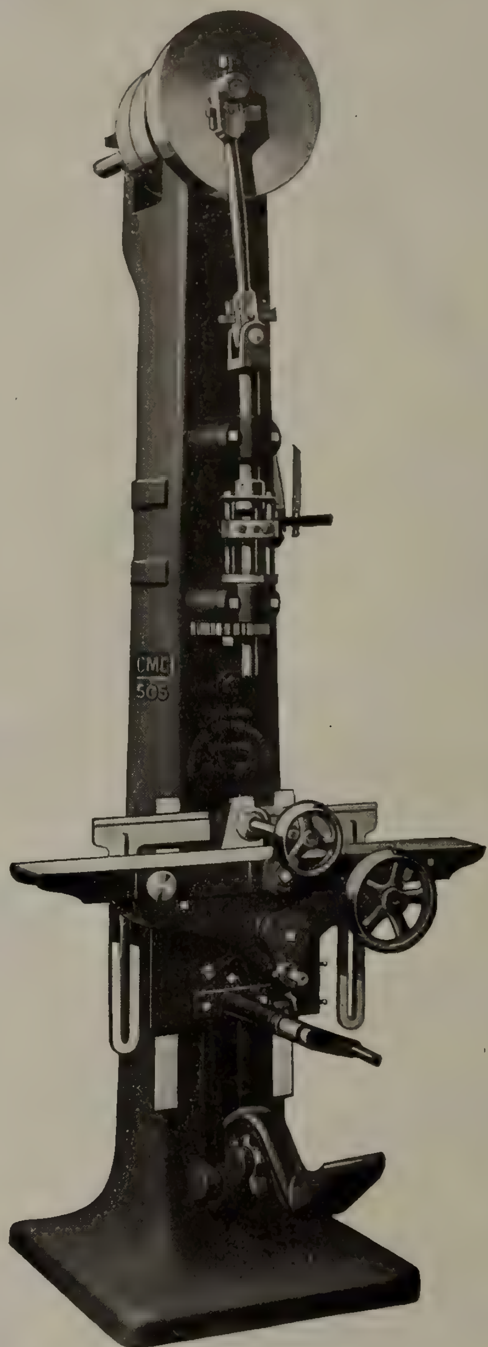
The above cut shows the front of the combination machine with self feed raised up leaving the machine ready for hand feed work. The frame is cast in one piece making it very rigid and this frame carries the mandrel in four mandrel boxes. The table is raised and lowered by right and left hand machine cut worms and worm wheels, which are self locking, doing away with all bolts and clamps.

All in all, the New "Hoosier" Combination Machine is the acme of perfection for the work it is intended to do and possesses many improvements not found on any other make of rip saw; requires a 50 x 54 in. floor space.

The Sinker-Davis Company Manufacturers of the New "Hoosier" Band Saw Mill and All Steel Nigger Proof Head Blocks **Indianapolis, Indiana**

MORTISERS C.M.C. MORTISERS

Our Power Mortiser here illustrated is fully described in our Bulletin No. 505 which will be sent on request to any address.



505 Power Mortiser

A strong heavy machine for severe work. Redesigned and improved.

Boring attachment supplied as an extra.

Immediate shipment from stock.

CANADA MACHINERY CORPORATION, LTD.

GALT - ONTARIO

Builders of High-Class Woodworking Machinery.

Canadian Woodworker

A Monthly Publication in the Interest of the Woodworking Industry.
Reaches the factories producing interior finish, doors, sash, flooring, woodenware, furniture, pianos, boxes, and general mill products.
Subscription, $1.00 a year; foreign $1.50.

Woodworker Publishing Company, Limited

Branches: Montreal, Vancouver, Chicago, New York, London, Eng.

Nicholls Building, Toronto
Phone Ade. 929

Vol. 14 | November, 1913 | No. 11

Special Number

A special number of the Canadian Woodworker will be published in December, to mark the closing issue of the year. We promise our readers a number which will do credit to the woodworking industry. The cover will be an attractive production. Special articles on a variety of subjects have already been arranged for, and we extend an invitation to our friends to contribute to this number from their practical experience. An interchange of views is always beneficial.

Proposed Furniture Building for the Canadian National Exhibition

IT is to be hoped that the proposal to establish a furniture building on the grounds of the Canadian National Exhibition at Toronto, will meet with success. Many of our readers will know something of the efforts that have been made in this direction. Last month a number of gentlemen engaged in the furniture business applied to the Toronto Board of Control for the use of three buildings at the Exhibition. It is proposed to inaugurate annual exhibitions of furniture in Toronto along lines similar to those held at Grand Rapids, New York, and Chicago. There are some four thousand furniture stores in Canada, many of whom send representatives to the exhibitions in the United States and place considerable orders over there, and it is hoped to show such as these that Canada is turning out products which compare favorably with any others on the continent.

Undoubtedly the erection and equipment of such a building would give the Canadian furniture industry a great impetus. Canada is essentially a country of wood products and we must seek the means of educating ourselves to the enormous possibilities in this field. As one comes to think of it, it is almost inconceivable that the C. N. E. directors should have overlooked a Furniture building so long, especially when one thinks of the tremendous space that is given over to other industries. It is to be hoped that the authorities concerned will take an active initiative in this matter, for the lack of adequate facilities in this field constitutes one of our most serious industrial shortcomings: not only that, but it militates against Canadian manufacturing interests in that many orders are going out of the country.

It is of interest to note in a contemporary a reproduction of the front elevation of an eight-storey furniture exhibition building planned by the manufacturers of Jamestown, N.Y. The structure is to be one of the finest in the city—spacious, well-lighted and substantial, and suitable for the purposes for which it will be built: a building where the manufacturers can meet the salesmen from the big department stores in the environment of their business.

The conditions are not quite parallel, because the exhibition at Jamestown is to be a permanent one, but the example of enterprise in this direction holds good. A really creditable building at the Toronto exhibition grounds will meet our present requirements. It will give our manufacturers an opportunity to display their goods attractively—something which they cannot do in the factory because of lack of space. Buyers want to see the finished product and they can do so to the best advantage in an exhibition building. We are confident that if the scheme is carried through it will mean a largely-increased sale of Canadian-made furniture.

Lighting of Woodworking Factories

IS it not true that as a rule the owners of factories do not give sufficient attention to the question of lighting? It is not uncommon to find a factory very inadequately lighted, but well equipped in every other respect. In woodworking and furniture factories especially, should this subject be given more consideration, because it not only means a higher degree of efficiency throughout, but also greater protection to employees from accidents. Good light is the most effective protection that can be provided.

When opportunity offers, the operator of a machine should be consulted as to its location and the light. Too often this is not done. The owner of a factory has not a monopoly of the wisdom in the institution, and the employee should be encouraged to offer suggestions. Arrangements are sometimes poor for both artificial and day light. We know of a factory recently completed where many of the machines are so placed that the operators in the performance of their work shut out the day light from the very points where it is most required. In the installation, the position of the machines, the work to be done, the location of posts and windows, and every condition which may cause shadows and bad illumination, should be taken into account.

A specially written article dealing with the lighting of woodworking and furniture factories will appear in the December issue of the Canadian Woodworker.

Sharp planer knives and light, sharp sanding are the things that do the most to keep the grain of wood from raising during the finishing process.

Financial Conditions Sound—Trade Prospects Excellent

WITH 1913 rapidly slipping away from under our feet and with the plans and prospects of 1914 before us, we can only regard the developments of the last few months with feelings of gratification. World-wide expansion, part legitimate and part illegitimate, aided by the destructive Balkan war, had used up the limit of available capital and forced compression had become necessary to bring matters back to a normal state. International unrest caused a hoarding of gold in the leading European money centres, and London, which is only perturbed under stress, made its claim good for a share of the yellow metal by raising its discount rate. This hoarding of money was immediately felt by borrowing countries, of which Canada is one of the chief. The effect of this was, first of all, to cause Canadian banks to protect their own resources, and second, to check up expenditure, public and private throughout the Dominion.

Leading financiers in London foresaw part of the result of this withholding of capital, and for a time had misgivings as to the extent of the money squeeze, especially in Canada, Brazil and India. New Yorkers predicted calamity in Canada, but both in London and New York predictions were founded on false promises and failed to come true. That such was the case may be attributed to the foresight exercised by Canadian financial institutions and the excellent crop harvested throughout the Dominion.

How the banks are recuperating their funds is perhaps not so important as the fact that they are doing so. There is no doubt that the output of western wheat, 100,000,000 bushels of which have already passed through Winnipeg for export, have brought much new money to the banks. Then again, debentures of Canadian municipalities which were difficult to sell, have recently been disposed of in England and in the United States, and there are assets still to realize on, which will further increase the funds for continued Canadian developments.

After having recovered from what promised to be a trying period, a word of caution in regard to overcapitalized ventures might not be amiss. Canada has suffered both at home and abroad by capital inflation beyond the capabilities of the industries promoted. Many new and recapitalized companies are now passing through the refining process. The past should be a lesson to promoters and investors. Canada will stand for a lot of future discounting, but actual capital and not water are necessary to guarantee dividends.

It is necessary perhaps to go outside the domain of the woodworking industry to secure efficient tribute to the country's stability. We find that optimism was the keynote of an address delivered by Mr. A. W. Smithers, chairman of the Grand Trunk Railway, at the recent annual meeting of the shareholders held in London. Mr. Smithers stated that Canada should be proud of the manner in which she had stood the strain of a world-wide monetary crisis. Continuing, he stated that the whole world had been going through a very trying period for eighteen months, a period brought about by ten years of extraordinary trade activity, during which the newer countries had absorbed an unprecedented amount of liquid capital. The universal demand for money had caused things to slow down somewhat in Canada, but capital was accumulating again and Canada would readily obtain all the funds required to meet the demands of her continued prosperity. He saw nothing but prosperity ahead of the Dominion.

An eminent British capitalist, Mr. Begg, who returned to London after a visit to Canada last month, declared before the London Chamber of Commerce his firm conviction that financial conditions on this side were essentially sound and that there was no country in the world where investments could be placed more safely than Canada.

The Hardwood Market

THE changing developments which have been taking place in the hardwood market for some time, have caused the attention of business men to be focussed upon general conditions as they prevail both here and in parts of the United States. A certain dulness is manifest in some lines, and yet, judging from opinions obtained from representative hardwood men, this apparent depression is not by any means general. According to one authority, however, there is nothing to indicate that the outlook for the next few months is likely to be much more encouraging, from the point of view of the dealer, taking into consideration the present comparatively slow market. This falling-off is particularly noticeable in regard to birch, basswood and elm, while maple and black ash are in fair demand but at reduced figures.

The "Hardwood Record" in its current issue, commenting upon general market conditions in the United States, says:—"Generally speaking there is not much change in the aspect of the country's condition, and this can also be said of the lumber business. The positions of the various woods continues to be about the same as they were two weeks ago, and the demand from the various sources is about in conformity to the demand as last reported. It is unquestionably a fact that the comparative scarcity of money and the indisposition on the part of the bankers to finance industrial and business propositions at a reasonable rate of interest is being felt in business circles. This is especially true of speculative building, such as flat building, two-family houses, etc., which, of course, really does have a direct and noticeable effect upon the lumber business as far as building lumber is concerned. Buying is off, but hardwood men as a general thing are not reporting the same conditions as are concerns manufacturing and dealing in building lumber alone. In fact, as far as values are concerned, hardwoods continue to offer a solid front. Prices have not improved, nor are they likely to improve in the immediate future, but with the present condition of stocks at the mills and the likelihood that this condition will continue indefinitely, there is no reason to believe that millmen

will make any further concessions. In the South, favorable operating conditions have allowed the millmen to secure a nice assortment of stock, but nowhere is there any report that the supply is at all a justification of alarm, and, in fact, it is fairly generally reported that the actual amount of lumber on hand is not above normal. The recent reports of the two northern associations offer excellent proof that stock conditions at the northern mills continue to be in accord with the desires of northern operators. A further proof is seen in the complaints of the wholesale element that they cannot secure the stocks they want at the prices they are willing to pay, which would indicate without much chance of doubt that there is nothing remotely resembling a condition of panic among northern operators."

The "American Lumberman" in its last issue expresses the opinion that the hardwood lumber trades show a gradual improvement with a fairly good consumptive demand; that the general call continues to be strongest on plain first and second oak, and that owners of hardwood lumber are unanimous in the belief that prices are soon to be firmer, a remark which applied both to the north and the south.

The "Southern Lumberman" makes the following comment: "Quartered and plain oak continues the leading commodity in the hardwood market, though the latter is hardly as active as a month ago. There is also a fair call for poplar, especially in the lower grades, and the movement of chestnut and hickory is well maintained. Cottonwood, basswood and elm show little change from week to week. Ash is also about stationary, though keeping its place well to the top."

The whole question of the general market conditions is summed up in the following statement made by a prominent Toronto dealer:

"The market in Ontario for American hardwoods is at present and has been for the past few months, in a quiet state, but there has been no decline in prices. Oak, the principal American hardwood imported into Canada, is selling for as high a price to-day as at any time during the year. Nineteen hundred and thirteen has seen the highest prices paid for American oak since its manufacture began, and notwithstanding this fact the imports of this wood into Canada during this year will exceed twenty-five to forty per cent. in feet and dollars and cents. Yellow pine from the south is being dumped into Ontario at slaughter prices. This is occasioned by over-production in the United States, and is a serious drawback to the Canadian manufacturer of red pine, spruce, hemlock and white pine. It is hoped that the winter rains will soon curtail production in the South so that this unhealthy competition with Canadian woods will be eliminated. Taken all in all a considerable volume of business is being done, and conditions in the lumber trade might be a great deal slacker than they are."

The Handling and Care of Lumber as Factors of Economy in the Furniture Factory

Contributed by A. J. Mitchell, Goderich, Ont.

ONE of the most perplexing problems of the manager or superintendent of the furniture factory is how to reduce the cost of production. Frequently one is confronted with so many open avenues that he overlooks the direct path—the fundamentals get past him.

Now one of the fundamentals is the handling and care of the lumber before it goes into the factory. I will refer principally to quarter-cut oak and red gum. It is a well-known fact that the lumber purchased by the manufacturer to-day is anything but well-seasoned stock. Some of it is piled on sticks but a very few months before it is sawn and turned into furniture.

The handling and care of lumber are very important. When it is received by the manufacturer it should be inspected, measured and properly piled on sticks in the yard. The piling sticks in a pile of quarter-cut oak should not be more than thirty-six inches apart and for gum not more than eighteen inches apart; otherwise the lumber is likely to warp. A pile, say, twelve feet high, should not incline at the front less than fifteen inches, so as to protect the lumber in bad weather.

The next handling is for the purpose of loading the dry kiln, and here I might offer a few suggestions. Each kiln should be of sufficient dimensions to accommodate three trucks end-wise. The lumber should be piled on the kiln truck not close together, but between each board at the bottom there should be a space of three or four inches, this being reduced gradually until within the last three or four courses from the top of the truck the boards are close together. The object of this arrangement is to allow the steam to get through the pile. The piling sticks on the kiln truck should not be more than twelve or fifteen inches apart and the kiln should be wide enough to accommodate the truck used for that purpose. There may be as many of these kilns, side by side under one roof, as are required to have the accommodation of the factory. It is necessary to have the cooling shed between the kiln and the factory, so that the lumber can be run out of the dry end of the kiln to cool off for at least twenty-four hours before it is cut up.

The object of having the kiln long enough to accommodate three trucks lengthwise is to have a curtain between each truck, or two curtains in each kiln, for the purpose of regulating the humidity and temperature as the lumber passes from one cell to the other. When the lumber enters the first cell or temperature end of the kiln, it is not for the purpose of drying but for steaming. In this way the pores of the wood are opened and the acid contained in the wood is evaporated and taken off by the circulation of air, which is conducted through channels placed in each cell for that purpose.

When the lumber has remained in the steam cell or tempering kiln for not less than twenty-four hours it is pushed into the second cell and the curtain dropped behind it. In this second cell the humidity is considerably reduced and the temperature increased, but the change must not be too great or the lumber will dry too quickly on the outside, or case-harden. And yet

the temperature should be raised sufficiently to commence the drying process all the way through the board as the pores of the wood are open, due to the excessive humidity in the first cell. After the lumber has remained in the second cell for not less than forty-eight hours, it should be placed in the third cell, or drying end of the kiln, where the humidity is reduced to the minimum and the temperature is increased to the maximum. The lumber should remain in the third cell for not less than four days, or until nearly bone dry. Then it should be taken out into the cooling shed. While cooling, the lumber will absorb sufficient moisture from the atmosphere to make it factory dry. Lumber should not go into the factory to be cut up in the bone dry state as it would be offected too easily by the variations of temperature in the different departments in the factory, especially in winter.

Now let me try and show the points of economy. In the first place, by careful piling, time and steam are saved while the lumber is passing through the kiln, for when lumber is properly piled it will not twist or kink as it would otherwise. When lumber is badly twisted or kinked it requires more time and steam to straighten it out. Indeed much lumber is cut up for fuel because of this reason, as most manufacturers know. By arranging the kiln as I have described above, certain parts of the kiln can be used for the cheaper lumber, or core stock, which can be dried in perhaps half the time required by some other wood. When each kiln opens into the cooling shed, it facilitates access to the lumber and obviates the necessity for waiting for any particular truck owing to its taking rather longer to dry than usual. If the trucks were all run into one kiln, one behind the other, side-ways, and you had a car of basswood behind two or three trucks of quarter-cut oak, you would have to wait until the oak was dry or else remove the first trucks and replace them after you have got at the truck of basswood. This sort of thing takes time and it is an expensive proposition when you have a number of men working around the kiln with their machines standing idle, or doing work which they should not be doing, perhaps. There is no money for the employer in such conditions.

In my opinion it is one of the fundamentals in reducing the cost of production to have the lumber go into the factory in proper shape. It might pay some of the manufacturers to look around the yard and kiln and take note of how the lumber is put up to the stock cutter and also ascertain the cost of handling the lumber from the car to the stock cutter. They will observe perhaps what an expensive thing may be a little carelessness in this department.

An Idea Wanted for the Utilization of a Waste Product

An eastern concern engaged in the manufacture of hockey sticks from rock elm has a piece of waste 1½ to 2 ins. thick, 3 to 4 in. wide and from 32 to 38 ins. long. The material is well seasoned, clear and straight grained, and it is thought that this waste should be converted into a commercial product. In asking readers of "The Canadian Woodworker" to give their views as to the marketable possibilities of this material, the firm tell us that it is an ideal piece of wood to work, it having had six months air drying, and having been passed through live steam box under pressure, then thoroughly kiln dried. This is just one of those occasions where the bright idea of the practical man might be employed to excellent advantage commercially.

Protective Measures for Factory Workers

THE Medical Health Officer for Toronto, Dr. Hastings, in planning a system of health protection for factory workers, is setting an example which should be followed throughout the country. Dr. Hastings aims primarily to prevent the spread of consumption. Hitherto, tubercular infection has been quite unhampered and many workers in factories have fallen victims to the white plague through being placed in daily association with advanced consumptives. Factory workers are entitled to a measure of protection. It is not intended to take away the employment of those afflicted with tuberculosis but to separate them from healthy persons or to place them at work where the germs can not be communicated to others.

In this and in many other ways, such as the care of minors, the regulating of temperature, the study of occupational diseases and the provision of pure drinking water, the Health Department may make the venture of large benefit to the humble worker. There are many conditions in factory operation prejudicial to the health of the workers that would be remedied were medical warning given of them. Many bad conditions are the outcome of ignorance or thoughtlessness rather than of disregard for the welfare of the workers. If the proposed system is carried out with due regard for the personal liberty of the employees it should win their gratitude.

Birch Leads—Its Use in 1912 Greater than Maple

THE popular idea that because Canada is the land of the maple, the maple must necessarily be the hardwood of first importance in Canada is incorrect. There are three species of birch of commercial importance in Canada, the black, yellow, and white, or paper, birch. The former two have the more valuable wood, but are confined to eastern Canada, whereas the paper birch is found in every province of the Dominion, ranging to the limit of tree-growth towards the north and growing well within the Arctic circle in the Mackenzie River basin and in the Yukon.

It is this wide range which contributes largely to its present importance, but the qualities of the wood promise a still greater use in the future, for it is a strong, hard, fine-grained wood which takes a high polish and can be stained to imitate the more expensive woods, such as mahogany, cherry or walnut. "Wavy" birch is an accidental form due to cross-grain, somewhat similar to "curly" maple, and is highly prized for ornamental work. Birch is reported as being used in the manufacture of over one hundred different articles, ranging from ships to spools. As a fuel-wood, it takes first place and it is also one of the principal woods used in wood-distillation, while its only objection as a pulpwood is that it is too heavy to be readily floated down the streams to the mills.

Birch also formed 28 per cent. of the square timber exported from Canada in 1912, according to a bulletin on the production of lumber, square timber, lath and shingles for that year, which has been prepared by the Forestry Branch and will shortly be issued. The remainder was largely white pine. Until 1912 the export of square timber had steadily decreased since 1877, but last year showed a surprising increase, the quantity exported in 1912 exceeding that exported in the previous year by almost ninety per cent.

Canada's Greatest Woodworking Plant

The Operations, Output and Equipment of the Angus Shops of the Canadian Pacific Railway

OF the seven thousand men employed by the Canadian Pacific Railway at the Angus shops, Montreal, about four thousand are engaged in the car-building departments. It is obvious, therefore, that the company have an immense woodworking plant—the largest, in fact, in the Dominion. A visit to the shops, which cover, with the locomotive departments, thirty acres of ground, is necessary in order to adequately grasp the operations of the company, and to realize the multitudinous operations which are involved in turning out the many types of passenger, baggage and freight cars. To state one fact alone will give an idea of the extent of the activities at the Angus shops—the company use each month up to six million feet of lumber, gathered from all the ends of the earth. Much ic common lumber, but some is very choice wood. The Angus shops turn out in round numbers every year 20,000 vehicles of every description. Last year for instance, the number of passenger cars turned out was 248; freight cars, 17,000, and for maintenance of way, 119. Indications for the present year show that these figures will be exceeded. The C. P. R., in addition to the cars they build, give large orders to outside companies, especially for freight cars, of which the company now possess close to 100,000. In one year the consumption of lumber at the Angus Shops is approximately 45,500,000 feet.

Through the courtesy of Mr. R. W. Burnett, the General Master Car Builder, a representative of the Woodworker inspected the wood-working plant, and saw the operation of constructing cars, from the rough lumber to the finished product.

The various processes of building cars are carried on in several shops, huge departments planned for rapid and economical work, and grouped at one end of the plant. There are two sections, each with its own foremen and workmen. These departments have their separate shops, the passenger side occupying by far the larger space and employing the greater proportion of men. Naturally the passenger car work is of a finer character, some of the interior finish being excellent.

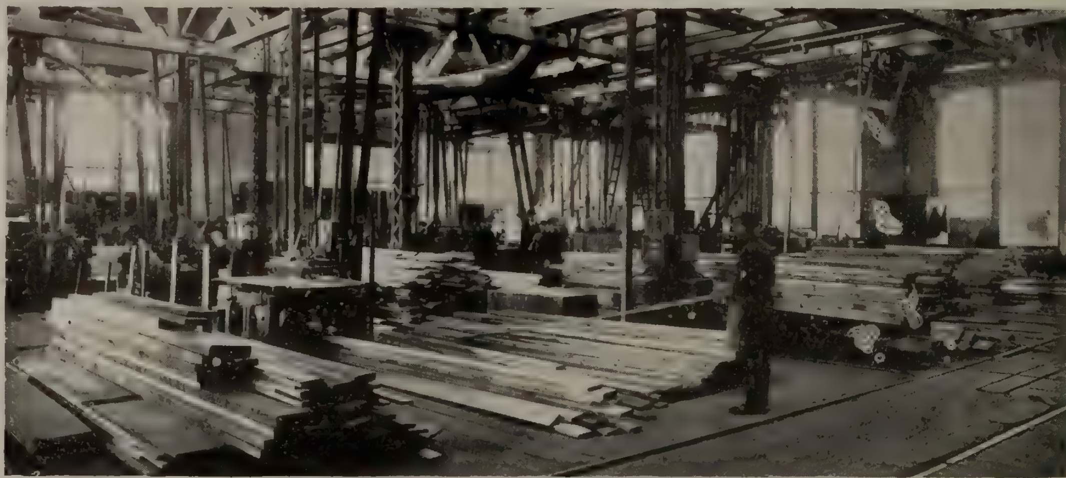
The lumber is stored in an extensive yard, with rail connections to admit of easy unloading. Adjacent to the yard is the planing and sawing mill, an immense shop divided, for working purposes, into the freight and passenger sections, running the entire length of the building. All the heavy work is done in this mill, and each department is under the control of the foremen of the passenger and freight car sections respectively. For the rapid handling of the lumber, rails are laid down each side of the mill, these connecting with rails from other portions of the plant. Lumber is placed on trucks and thus quickly moved from place to place. All the machines here, and in the other shops, are electrically driven.

Passenger Car Building

Taking the passenger car side first, it may be stated that a large quantity of B. C. pine is worked on in the saw and planing mill. Lumber as long as 72 feet in length is planed on four sides by a Berlin planer, and then goes to the various other machines to be further prepared. The machines include boring, mortising, cut-off sawing, band-sawing, and many others. This heavy lumber is chiefly used for sills, side sills and other parts of the car where strength is required.

The lighter parts of the lumber are prepared in the

Cabinet Shop at the Angus Shops of the Canadian Pacific Railway.



View of the planers at the C. P. R. Angus Shops.

Veneer Department, Cabinet Shop.

Passenger car erecting and finishing shop.

cabinet shop, which is two storeys high. Here are dozens of machines of all classes, including several sanders of various makes, a Linderman gluer and dovetailer, marqueterie saws, veneer jointer, mortisers, jointers, band saws, clamps, and in fact the usual equipment of an up-to-date shop of this character. There is one machine of a home-made character—a machine for polishing mouldings, the work being done by means of strips of sandpaper and leather and pads of felt, which pass over the mouldings and give them a thorough polishing.

In this shop, divided into two portions, on the ground floor, with hardwood storage in the centre, all the interior work required for the passenger cars is executed. The various pieces are sawn, planed, glued, moulded and prepared, ready to be sent to other shops to be varnished or to be fitted together and made into cars. In addition, chairs and seats for the parlour and other cars are made. There are six kilns in the shop, used for drying veneers, of which a large quantity is used.

Variety of Wood Used

The following will give an idea of the variety of woods used: English and American oak; vermillion; Honduras, and African, Sebecu, Cuban and San Domingo mahogany. For marqueterie, white holly, satin wood, tulip, emerand, and black walnut are utilised; while birch, white wood, ash, quarter sawn oak are also used. Mahogany is used for dining, sleeping, and parlour sheathing, and interior work, and white wood and birch veneer for inside backing.

A considerable portion of the lumber is dried in kilns situated just outside the shop, steam being employed. The lumber is conveyed from trucks into the kilns on lorries, and brought out in the same way. Adjacent to the cabinet shop and near the kilns is a very large storage shed for hardwoods.

When manufactured, various parts are sent from the mill and cabinet shop to the erecting departments. In one of these the tourist, parlour, sleeping and colonists cars are put together, and afterwards, the bodies go to another shop, where they are varnished and the interior work fitted. The lettering is also put on, and the upholstering work done. With the placing of the trucks into position, the coach is completed.

The passenger department is responsible for the building of what are known as automobile cars, which are also used as baggage and horse cars. A fair amount of heavy lumber is used in these cars. This is sent to one of the shops, and the cars built on iron frames, glued, bolted, and nailed, the trucks being placed into position before the work commences. The cars are stained, painted, varnished, lettered and finished. The sheathing for the outside work is oiled, and then put into a steam dryer. Flanger cars are also built in the same shop, these cars being very strongly constructed, with a scoop for removing ice and snow from the tracks.

Repair Work

A large amount of repair work is carried out, cars of all descriptions coming into the shops once a year for repairs and overhauling.

In the varnish room, the doors and sashes and certain other small parts are varnished. They are then placed in racks to dry. The room is divided into two parts by an iron door, to prevent fire spreading in case of an outbreak.

There is a very extensive upholstery department. The cushions and draperies are dyed in a special dying room, and afterwards dryed in an adjoining dryer. The leather used in making cushions, etc., is purchased in the form of skins and are made up in the upholstery department.

Passenger car cabinet shop.

Complete cars are moved from shop to shop on an immense transfer table, 75 feet long, electrically controlled, running in the centre of the four passenger car shops, two on each side.

The Freight Cars

The work in the freight car department is of a more straightforward character. The tendency is for less work to be done in these shops, owing to the displacement of lumber by steel. It is not improbable that even in passenger cars steel will largely take the place of lumber; a beginning has been made in that direction, and the company are now building new steel car shops, which may be an important factor in the substitution of steel for lumber. At present B. C. pine, white and yellow pine, and white oak are chiefly used in building the freight cars. The lumber is prepared in the saw mill previously referred to, such lumber as is necessary to dry being taken to the kilns before being worked on. The wood-working machinery is largely a duplication of that installed in the passenger car division, all the shavings in the mill being conveyed by blowers to the power house and fed to the boilers. The lumber is ripped and sawn into the required lengths, passing to the various machines, in a continual process of manufacture. As the work is very heavy many of the machines are equipped with moveable tables. All the patterns are marked by templates.

The lumber for flooring and heavy sheathing comes direct from kilns on rails, to the matchers and cut off

Assembling Department. Baggage cars in course of construction.

saws and so to the erecting shop. The kilns are separate from these used for drying hardwood, and are situated handy for the planing mill.

In the Filing Room

At one side of the mill, on a floor above, is the filing room, equipped with various machines, including automatic grinders for knives and band saws, and cicular grinders. The saws are supplied by the Simonds Canada Saw Company, the Sorel Saw Company, Henry Disston and Sons, Limited, Toronto, and T. Robinson and Sons, of Rochdale, England.

The prepared lumber is sent across to another shop, where it is built into cars, but before the sheathing leaves it is dipped into a tank of paint and afterwards piled to dry. The large lumber goes to make the sills, the sheathing being bolted to a frame work of steel. Slot holes are made in the frame, so as to allow for shrinking of the lumber and the tightening of bolts. The B. C. pine is chiefly used for sills, some of these being 9 x 9 x 9, while the cross ties are 4½ x 8 x 9. Longitudinal sills are employed in the old type of car, but these are now gradually being eliminated.

Machinery

It will be gathered from the above that the company have a very large number of wood-working machines. These were supplied by the Berlin Works Limited, Hamilton, Ont.; McGregor, Gourlay & Company, Galt, Ont.; Greenless Bros., Chicago; J. A. Fay and Egan Company, Cincinnati, Ohio; Buss Machine Company, Holland, Mich.; Canadian Linderman Company, Limited, Woodstock, Ont.; Bentel and Merregedant Company, Hamilton, Ohio, U.S.A.; Moore Carving Machine Company, Minneapolis; Baxter D. Whitney & Son, Winchendon, Mass.; Canada Machinery Corporation, Galt, Ont.; Cowan & Company, Galt, Ont.; Fall River Machinery Company, Fall River, Mass.

Roller carriers properly aligned will carry lumber straight for quite a distance without guides, and if they are mounted on ball bearings just a light push will send a board quite a ways. This idea is being used on some factory yards to save hauling or tracking lumber from the cars to the piles.

This general view of the saw-mill at the Angus Shops conveys, on careful examination, an idea of the immense extent of the departments. Note the figures in the middle distance.

Discrimination in the Buying of Stock

By J. Mason

DISCRIMINATION or careful selection in the purchase of stock for manufacturing purposes does not mean that a man should buy the highest grade of stock on the market or anything of that kind. It is imperative that we understand this distinction at the present time because there is being offered to and urged upon the furniture manufacturers and other users of hardwood in various forms low-grade stock in hardwoods. It does not follow that because a furniture manufacturer, for example, buys and works up low-grade stock that he will produce an inferior article of furniture or even have inferior wood.

The main distinction between low-grade and high-grade stock in hardwood is that mingled in with the good material in the low-grade stock is a lot of defects that must be trimmed out in working to make it clear. When these are trimmed out and clear stock is secured this clear stock is just the same as stock from a board that is clear all the way through. In other words, the clear stock and the low-grade quite commonly come from the same log, a certain percentage of one and a certain percentage of the other. The material is all the same. Indeed, if there is any difference it is probable that lots of the low-grade is superior in strength and of the finest grain, because quite frequently it is the interior or heart of the wood. Lots of the clear stock comes from the outside and is either sappy or close to the sap and consequently is more open than the interior of the tree.

Where a furniture manufacturer buys his stock cut to specific dimensions at the mill, discrimination in buying stock quite naturally implies buying the highest grade of material offering, because the stock is already trimmed to size and should be clear and of proper grain. Then the matter of selection is simply one of grading. However, when a furniture factory goes to buy lumber to be cut up and refined at its own plant then it is a different matter. It will be found here and there that certain kinds of defects may cause more waste than others or make it more difficult to get clear stock in the dimensions required.

It is seldom that there are any really large dimensions required in furniture making. No ordinary piece of furniture ever calls for a piece of clear lumber as

large as an ordinary clear board. It may be as wide but it will not be full length. Consequently, one may either buy clear short-length stock or buy rough lumber that has knots or other defects and by trimming these out get clear short lengths, or small dimensions and when this is properly done the resultant product is, as stated above, just as good as if it came from an entirely clear board.

The main point for discrimination aside from that of selecting the kind of timber wanted is to discriminate in selecting such lumber as will cut the greatest percentage of clear stock into the dimensions wanted, that is to give one the most good stock for the same amount of money. It doesn't matter whether that stock is No. 3 common oak, No. 2, No. 1 or log run, by getting sample lots, making a note of the cost per thousand feet in the rough, trimming it up and measuring the exact amount of good stock gotten out of it for furniture and comparing this with the cost per thousand one can soon arrive at a demonstration of which is the best to buy. Of course, there must be taken into consideration the cost of doing the trimming and reducing to dimensions.

In following out tests or experiments of this kind, if the work is carried far enough, it may be found that stock from certain mills of an even grade with stock of other mills will work better because of the grade of timber or nature of the defects, and it is out of this knowledge, knowledge gained through careful attention to experiments with different grades and kinds of lumber, that one gains knowledge for use in buying lumber with discrimination. This knowledge is becoming essential, too, to the conduct of furniture and other factories consuming lumber now, because the great burden of the mill man is that of low-grade stock and more of this must be utilized in such work. Otherwise the price of the clear stock will have to be raised beyond the reach of many purchasers in order for the mill man to make a profit out of their stumpage.

The great need is utility, devising ways and means to use every bit of our hardwood stumpage to the best advantage. We can do it by experimenting and carefully discriminating and selecting stock. They can do this and not help the mill men but quite frequently the furniture manufacturer might be able to further his own interest at the same time.

Bolting and Blocking by Band-Saws

Contributed by S. H. Field

SHOPS using stock in thin and short sections can use band saws to advantage in cutting up and sawing to stock shape and size. Take, for instance, a factory for making spokes and handles. The drag saw is not to be compared for efficiency and saving of stock, with the band saw arranged to be used instead of a drag, or, more properly speaking, as a cross-cutting machine, and where logs up to 22 in. or 26 in. are to be cut up to handle and spoke length, and even for longer stock, the band should be used in preference to the drag.

The spoke mill should also use special band bolters for splitting the short logs into stock sizes for spokes and handles. For this purpose, the band should be fitted with a power carriage with adjustable travel-motion and the bolt should be simply laid in position, steadied by the hand and the carriage started. The speed of cut o rsaw travel, even through logs 24 in. in diameter, possible with a 5 in. band, arranged as above, will astonish the man who has not seen a well designed mill of this kind in operation.

The sawyer has one assistant, who rolls a short log, or "bolt" from skids to carriage, where the former receives and places the bolt and signals the latter to roll the bolt until it is in position to suit the sawyer in regard to the first cut. This is determined by the position of knots, shakes, etc., which may exist in the bolt. If the bolt is perfectly sound, there is no choice in position for the first cut.

When the bolt is in position, the sawyer steadies it with one hand on one side, while the assistant uses both hands on the other side. The power feed is then thrown in and "zip" goes the saw right through the heart of the bolt. As the saw leaves the log and the carriage stops, the assistant very carefully rolls his half of the bolt back a little to clear the saw, while the sawyer does the same with the half which falls to his care. The assistant shoves his half of the bolt to the end of the table, back of the saw, flat side of the piece downward, and leaves it there until the sawyer's half has been disposed of, the carriage being gigged back by power, controlled by the sawyer, the instant the assistant places his half of the bolt away from the saw.

The next cut of the band saw, splits the sawyer's half of the bolt square through the heart and the assistant offsets his piece, which is a quarter of the bolt. The sawyer likewise draws back his quarter of the bolt, doing this with one hand, while he throws the gig-back lever with the other and starts the carriage back the instant both quarters are freed from the saw. Considerable skill and quickness on the part of both sawyer and assistant are required to save time at the saw and to prevent possible accidents by either loose piece of the bolt coming in contact with the saw during the backward movement of the table or carriage.

On the sawyer's side of the saw, hinged to the saw table, is a fence which may be set to cut any required thickness of stock, or which may be thrown up out of the way of a whole or half bolt by a single movement of the sawyer's hand. As soon as the half bolt has been split, the assistant draws backward the quarter which lies on his side of the saw, the sawyer rolls his quarter upon the other sawed surface, brings the quarter against the fence and sends it past the saw, cutting off a piece the thickness of stock required and as wide as the half-diameter of the log or bolt will allow.

Close behind the sawyer, or close to his left hand, should be placed a factory truck, upon which the stock sawn off is deposited, the pieces in question having one square and one bark edge. While the sawyer is disposing of his portion of the cut, and gigging back the saw-table, the assistant seizes the remainder of the quarter the instant the saw leaves it, draws back the piece enough to offset it from the saw, and turns it "end for end" the instant the table stops its return movement. Some assistants become so quick and expert that they have the quarter-block reversed by the time the carriage or table is back again. Then, the quarter-block is rolled over to present one sawn sur-

face to the fence and to rest upon the other one and another stock thickness is taken off, while in this position.

The cutting and reversing is continued, each succeeding cut being made through the face which was next to the fence during the preceding cut, so that the last piece comes from the sap-wood, midway between the two saw cuts first made in the bolt. By this method of cutting—which is NOT quarter sawing—one corner of each stock-piece points approximately toward the centre of the bolt, and there is no piece in the whole log which has a side squarely toward the heart. Whether or not this method of sawing gives greater stiffness and freedom from warping to the spokes, is a matter of opinion and each man is entitled to his own. But they do it, in getting out spoke stock, and they are not apt to do such things just for fun or for their health!

The cuts, as piled upon trucks by the sawyer, are pushed to the rip-saws by floor laborers—the machine men never leaving their saws—and the spoke blanks are finished by ripping on power feed rip-saws, two men at each, the assistant piling the spoke blanks on another truck and the edgings on a third. There are a good many bits of wood, in making large spokes, which will not answer, and these pieces, instead of being thrown away, should be placed upon another truck and split down to make surveyor's stakes, tent pins and "keys." The latter are short pieces of wood, with a hole in either end, and are used for tightening the ropes from tent to pins. Some shops lose all this material, but others utilize everything, right down to the bark, and that's the way to do it, every time!

From the self-feed rip-saws, the spoke blanks go to equalizers, where they are squared up and cut to length at one operation. Next, they go to the spoke lathes; that form which is fitted with heads reaching the entire length of a spoke, seeming to be preferred. The spoke blank being mounted on centres and brought slowly up to the revolving cutter head, depends upon the set-up of the head for the shape of the spoke, the size being determined by the distance of centres from the revolving cutter-head.

Where small orders are to be got out, and to save the expense of making the many knives required for this kind of spoke lathe, there may be used the kind which employs a pattern, perhaps larger than the spoke to be made, but of about the same shape, and using a single cutter-head or a saw to remove the superflous wood from the spoke blanks. While these lathes are much used for general work, it seems that the other form is desirable where very large orders are to be filled.

The sand belts and the tenoning machines must not be overlooked, as both are indispensable in spoke making. Two sand belts should also be used, one fitted with 1½ sand paper, the other with coarser. The final operation, bundling for shipment, being done by tieing with several spokes left out, then these are driven into the middle of the bundle, making it very tight indeed.

Something About Advertising

THE failure of a trial advertisement has set more business men against advertising than any other factor in publicity. This is a pity when the indefiniteness of a trial advertisement is considered. A trial advertisement represents low water mark—absolute bottom. It is not decisive. It has no more value as evidence than a first meeting with an individual who afterwards becomes your friend. Of all the advertisements in a long campaign, the first ad is the worst, though it is written by an adept. If it is well written by a novice in advertising that novice will never write a weaker one. It is like the first discord struck out of the piano by a beginner. If a student becomes disgusted with such an initial effort he will never get farther, and if a merchant abandons his advertising intentions because the first advertisement was unremunerative, he will never get farther. The first attempt of anything is valuable only as an educator. Advertising is like seed sown, it's got to have time to grow before you can reap the harvest.

If a paper, after careful examination, impresses you at all favorably, it's worth giving it a fair trial. In no case should a trial ad be inserted for less than six months. If the paper is going to be a paying investment for you, it will begin to show results by that time.

There is a big difference in feeding a cow just enough to keep her alive, and feeding her enough to create a profit. The same is true about advertising. Nine times out of ten a small advertisement inserted once or twice is simply a waste of money, while the same advertisement inserted for six or more months would have become a paying investment.

Best Way to Finish Oak with a Polish

A PAINTER in one of the western states having to do a job involving the finishing of oak with a good polished surface, wrote the Painters' Magazine for information. In reply to his question the authority named offered the following:

First have the wood well sandpapered, cleaning up any soiled places; then thin a good mineral paste wood filler (that made with straight silex in the pigment being best) with pure turpentine to the consistency of medium bodied varnish; apply it with a good brush and rub it well into the grain and pores of the wood. When fairly well set, which is when it begins to show flat, you can rub it into the wood with a pad made by gluing leather onto a block of wood, always rubbing across the grain. For round moldings of balustrades, have a long strip of leather to draw back and forth around the work. Fill only as much surface at a time as you can wipe off before it sets too hard to wipe off without rolling up. Wipe off with tow or excelsior shavings all the filler except that which is in the grain or pores, and be careful to have all the grains and pores level full of the filler, because upon that feature the success of your work depends. All rubbing and wiping must be done across the grain. Give the filler all the time to dry you can, but never less than thirty-six hours, especially where the grain is rather open. When dry, go over it lightly with No. 0 sandpaper to take off every particle of filler left on the surface. The cleaner you wipe off the filler, the cleaner the finished job will be. If you desire your oak stained it is best to have the paste filler colored, and you can obtain it from the manufacturer in the natural, in antique, golden or weathered effect, so that you need not stain the wood first.

If you want to do high-grade work, it is well to examine the filler surface with a magnifying glass to see if the pores are well filled and no pinholes visible. If there are such defects, it is best to go over the surface with a filler a second time, but have it of thinner consistency than at first, and repeat the operation of rubbing, wiping off and sandpapering. Now you can

apply one or two coats of white shellac, which, when hard, rub down with fine sandpaper; then put on a coat or two of hard oil finish or cabinet rubbing varnish and rub down with curled hair or hair cloth to dull the gloss. The shellac varnish may be omitted, but in that case an extra coat of varnish will be needed.

If you want merely a good eggshell gloss, rub the last coat with raw oil and flour of pumice and wipe dry with soft cloth. For a good polish rub with flour of pumice and water first, then wipe dry and polish with rotten stone and sweet oil.

For high luster, apply a coat of cabinet finishing varnish on the rubbed varnish surface and omit rubbing this.

Lay-Out of a Desk Factory

IN designing and constructing a modern woodworking factory, two of the most important factors to be considered are the lighting and the lay-out of the machinery. The even distribution of a good light over the whole of a factory floor makes for efficiency; the location of the machines in such a manner as to ensure the best routing of the material increases the production. These things are well illustrated in an interesting article descriptive of the Rockford Desk Company's factory, at Rockford, Ill., which appears in a recent issue of the "Furniture Manufacturer and Artisan."

The arrangement and equipment of the mill floor is shown in the accompanying floor plan. All power is electrical and is purchased. The small steam plant for dry kiln and heating purposes is located in a one-storey wing adjoining the main building.

The exhaust shavings, sawdust and other refuse are, of course, discharged to the boiler-room and form the principal fuel used except in winter months, when some coal is purchased.

The use of electric power throughout the factory and individual motors for each machine is, probably, the most interesting feature. The elimination of all overhead shafting is noticeable in the accompany interior views, and the convenience, cleanliness and saving in annoyance and supervision will be readily appreciated by every furniture factory manager or superintendent. In furniture factories especially, overhead shafting is a burden because of the relatively large floor space required for piling the stock and the partly finished products which scatters the machines and requires the use of long lines of heavy shafting in the case of belt drive.

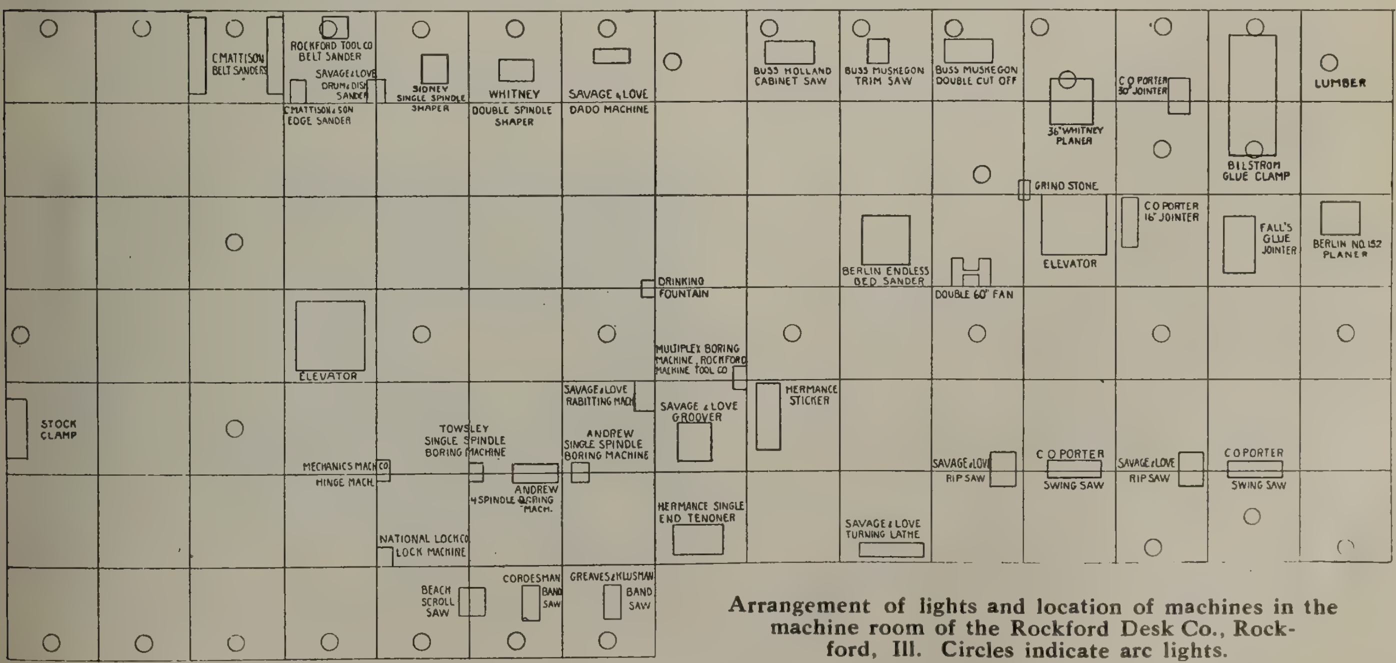
Formulas for Making Shellac Varnishes

IN answer to a correspondent desirous of obtaining formulas for making orange and white shellac varnish, both with denatured and wood alcohol, our contemporary, "The Painters' Magazine," advises the following:—

When using denatured alcohol, see that you have that known as 188 degrees, as other kinds are not as good in solvent power. Wood alcohol for dissolving shellac is usually designated as 95 per cent. wood spirit. The latter is higher in price than the former, yet it is the denatured article which is least objectionable so far as the effect upon the operator's system is concerned. Whether you can make shellac varnish at a lower cost than you could purchase it from the makers depends upon the cost to you of the materials, which again depends upon the quantity you can purchase at a time. Orange gum shellac is designated as D. C. for the best, V. S. O. for the next grade; then follow Diamond I, Fine Orange, Second Orange and T. N., and prices range accordingly. Bleached or white shellac can be purchased in hunks or bone dry, granulated, the latter form being best for your purpose.

Orange Shellac: 4½ pounds of gum as above; 1 gallon wood or denatured alcohol. Digest in a suitable mixing keg for large batches, or in a wide-mouthed glass jar for the small quantity given here. Agitate or shake the mixture occasionally until all the gum is dissolved. To hasten solution, keep in a warm place, or place jar in a warm water-bath. The batch noted above will produce one and one-third gallons.

White Shellac: 5 pounds bleached shellac; 1 gallon wood or denatured alcohol. Follow directions given for orange shellac. Keep the product in glass jars or earthen jugs, as tin is liable to discolor it. Some users call for pure grain alcohol shellac varnish, but manufacturers have given up the manufacture of such a product long since, as consumers will not pay the price it would be necessary to charge.



Arrangement of lights and location of machines in the machine room of the Rockford Desk Co., Rockford, Ill. Circles indicate arc lights.

Up-to-Date Woodworking Department in New Factory at St. John, N. B.

ONE of the most modern manufacturing plants in Canada has recently been completed at Fairville, near St. John, New Brunswick, for Messrs. T. S. Simms & Company, Limited, who, for many years, have been large manufacturers of brushes and brooms. In the building of this plant the most up-to-date ideas have been followed as to the layout of the departments and the type of construction and equipment of the buildings. The health and well-being of the employees have also received due consideration.

The plant consists of a four-storey factory building of reinforced concrete, 400 feet long by 52 feet wide, with a basement under one-half of the building; a dry kiln building, 52 feet by 62 feet by two storeys high, and a power house, 50 feet by 70 feet, built with reinforced concrete frames and hollow tile walls. One of the unusual features of this plant is that it is not dependent upon outside sources for water, power or fire protection. The water supply is provided by an artesian well, 300 feet deep, equipped with a double stroke pump having a capacity of 4,000 gallons per hour. The power plant consists of two 150 h.p. boilers and a high speed vertical engine direct-connected to a 188 kv.a. alternator, which supplies the current for twenty-seven motors throughout the plant. The fire protection system consists of a 100,000 gallon reinforced concrete storage reservoir and a 1,000 gallon fire pump which is connected to four yard hydrants and also used to fill a 40,000 gallon roof tank which supplies water for the sprinkler system throughout the plant.

Before the new plant was built, a careful study was made of the processes of manufacture in the several departments, and the new plant was planned to secure the most efficient handling of material from the raw state to the finished product. These preliminary investigations were made by the owners and the resulting layouts were taken to the engineers, Lockwood, Greene & Company, of Boston, Mass., who designed the buildings and equipment layouts to give the desired results.

Probably one of the most efficient and best appearing departments in this plant is that of the woodworking department, where all the woodwork connected with brush-making is done, such as brush handles, dowels and brush backs. The larger portion of the handles used in this factory are made on the premises.

One of the best features of this department is the absence of nearly all shafting and belting, affording a clear ceiling and much better light on the machines. This result was secured by placing this equipment in a basement under this section of the building. The shafting and motors were attached to the floor of the basement and belted to the machines from below.

Brush Factory of T. S. Simms & Company, Limited, St. John, N. B. The woodworking department is situated on the first floor.

The machines in this department consist of a railroad saw, four heavy saws, one cut-off saw, two straight moulders, nine spindle moulders, two planers, two rip saws, one dowel machine, four band saws, three sanders, two sand drums, four band boring lathes, two large lathes, four auto boring machines and two multiple borers. There is also a room for filing saws, a small dry room and four dye vats on this floor.

These machines have been laid out as nearly as possible to conform with the routing of the material, so that the stock enters at one end of the department in the raw state and leaves at the other, a finished product, as far as this department is concerned.

The raw material for the woodworking department consists mostly of beech and maple, which is received at the plant in the form of rough plank, sawn alive. These plank are shipped on flat cars and are run onto a siding beside a large lumber shed where they are unloaded and piled until required in the factory. The plank was taken from the shed to the factory by a cable conveyor which carries them into the woodworking department and delivers them to the railroad saw. This

General view of the woodworking department. The machines are driven by motors in the basement.

machine cuts them into pieces of the desired length, which pass to the circular saw tables a little further on, where they are cut up into small blocks just large enough for the shape of the desired handle. These blocks are then piled on to small trucks which carry them to the kilns near by for the drying process.

The dry kilns are located in the second storey of the kiln building which is on the same level as the woodworking floor in the main factory and connected to it by means of enclosed bridges. The six kilns are arranged to open on an alley at each end, these alleys being continuations of the passages from the main factory. These kilns are operated under the Grand Rapids System of drying, by which the lumber is first saturated with steam and then dried. The steam enters the kilns from a spray pipe located near the bottom of the chamber. Heat is furnished by means of one coil in the bottom of the kiln consisting of 62 1-inch pipes having a total length of 32 feet and arranged in two layers. The steaming process lasts about 24 hours. As the steam is turned off, the heat is turned on and at the end of the sixth or seventh day the drying is completed. Each kiln is supplied with recording thermometers, and recesses, or openings, are left in each kiln for inserting the instrument used for indicating the moisture.

The blocks ready for drying are trucked from the cutting-up saws into the alley of the kiln building and into the kiln which is being stocked, the blocks being taken from the truck and piled up inside the kiln. When the drying process is completed, the blocks are removed from the other end of the kiln and taken down the alley into the main building again, where they are stored in bins, if not wanted immediately, or taken direct to the planer or straight moulder. From the planers they move to the various shaping machines, such as the band saws and moulders, where they are given their final shape.

The brush backs, which have to be bored for receiving the bristles, are first shaped and then carried to the boring machines. There are two types of boring machines used: one, the auto borer, bores the numerous holes automatically, the various designs being obtained by means of different cams; the other machine, the multiple borer, bores all the holes at the same time and at different angles. Both of these machines have been developed by the owners and are great time-savers. From here the handles are taken to the sanders and then to the dye tubs, where they receive their color coating, and are then passed on to the dry house.

An interesting feature of the plant is the dust-collecting system which removes all the dust, shavings, chips, etc., from the floors and carries them to the boiler room, thus saving the handling usually found necessary in the older plants, and, better still, improving the health of the employees, who are not forced to inhale the dust. A large part of the plant refuse is made in the woodworking department in the form of sawdust, chips, shavings and waste blocks. The first three are removed by the dust-collector system. All the necessary machines are fitted with hoods connected to pipes which join a main system. As the sawdust and chips are made, they are drawn into the pipe by means of a 35-inch slow speed fan situated in the basement. They are then discharged into a large pipe which leads to a collector on the roof of the boiler house. From this head, the material drops down through chutes into the boiler room and into the furnaces. The refuse blocks drop through the floor on to a conveyor which carries them outside the building into a waste wood house where they are deposited in bins. Each bin holds just a cart load. This waste wood is sold for fire wood, and a cart coming after it drives under the bin and by dropping the bottom receives a full load.

The construction of this new plant was started on April 17, 1912, and was practically finished the first of the following year. The installation of the machinery began the last week of December and actual manufacturing started January 2, 1913. The plant was running in full swing the latter part of February.

Another view of the woodworking department at the Simms plant. Right and left hand moulding machines in foreground.

Artificial Ebony from Oak Wood

The following is said to be a good process for converting oak wood to artificial ebony: The blocks of wood are immersed for forty-eight hours in a warm saturated solution of alum and sprinkled several times with a decoction of logwood; smaller pieces may also be steeped for a certain length of time in the decoction, which is prepared in the following manner: One part of logwood of best quality is boiled with ten parts of water; it is then filtered through linen and the liquid evaporated at low temperature until its volume is reduced by one-half, and to every quart of this bath are added ten to fifteen drops of a saturated solution of soluble indigo entirely neutral in reaction. After having watered the blocks several times with this solution, the wood is rubbed with a saturated and filtered solution of verdigris in warm concentrated acetic acid, and this operation repeated until a black color of the desired intensity is obtained. The oak wood dyed after this fashion presents an aspect similar to that of real ebony.

Rudimentary Rules for Figuring Feetage Cost of Boxes

By W. R. Smith, Alton, Ill.

THE unit of measurement on which sales of rough lumber is based is the board foot which is that quantity of lumber 1 in. thick, 12 in. long and 12 in. wide, or its equivalent in cubic inches (144) factor of thickness as designated in purchase. Most lumber used in boxes being bought on basis of board measure, price usually expressed per thousand feet it follows that the board foot logically becomes the unit of measurement and expression in lumber requirements of box cost figuring.

The number of board feet in a given board, plank or timber is arrived at by multiplying the length in feet by the width in inches, by the thickness in inches and dividing by 12. This being equivalent to ascertaining cubic inches and dividing by 144.

If a square foot of lumber be 2-in. thick it will represent 2 board feet, or if it be 2-ft. in length it will contain 2 board feet. It is also apparent that a square foot of lumber $1\frac{1}{4}$-in. thick represents $1\frac{1}{4}$ board feet, $1\frac{1}{2}$-in. thick equals $1\frac{1}{2}$ board feet, etc. Length and width affecting directly in the same manner, for illustration a board 14-ft. long, 8-in. wide and $1\frac{1}{4}$-in. thick equals ($8 \times 14 \times 1\frac{1}{4}$) divided by 12 equals 11 2-3 board feet.

Measurement of Manufactured Lumber

In working lumber with cutting tools it is apparent that its working to suitable condition from rough lumber must be at the expense of thickness, width or length. Manufactured lumber is measured by that quantity of rough lumber assumed necessary which when worked will produce the quantity of manufactured lumber desired.

Planing

Both sides of rough lumber are rough and for most purposes unsuitable until smooth, this can only be accomplished by cutting away the rough surface until a smooth, even surface remains—planing. The amount of lumber which must be removed has been found to vary from 1-32 in. to $\frac{1}{8}$-in. or more and has been arbitrarily set as 3-32-in. The standard thickness of 1-in. lumber dressed on both sides is set at 13-16 in. If dressed on one side $\frac{7}{8}$-in. is the standard. One-inch lumber resawed into two equal pieces is expected to yield two pieces which will plane full $\frac{3}{8}$-in. thick. This brings us to the subject of resawing.

Resawing

The resaw blade cutting a thick board into two thinner ones of course removes some material which is wasted in saw dust and this portion of the original thickness is called "kerf" or waste of the saw. It is usually taken as 1-16 in. but varies for several reasons and is usually more.

It requires 1-in. lumber for two pieces $\frac{3}{8}$-in. thick dressed on one side, $1\frac{1}{4}$-in. for two pieces $\frac{1}{2}$-in., $1\frac{1}{2}$-in. for two pieces $\frac{5}{8}$-in. This is accepted generally. In the actual working the operation can be varied in many ways, but regardless of how obtained thicknesses are figured as obtained as above.

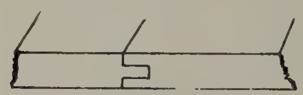


Fig. 1—Match tongue and groove.

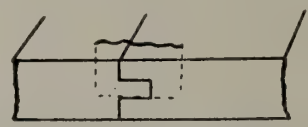


Fig. 2—Match tongue and groove re-inforced with corrugated steel fasteners.

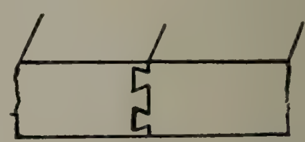


Fig. 3—"Linderman" method of dovetail glue jointing.

Matching and Jointing

Matching and jointing, to obtain the effect of wider lumber effects a waste of material and reduction of cross-section but are not considered in estimating the lumber contents of the box. This with waste in removing objectionable defects from the material and obtaining desired sizes is, or should be, taken care of unless waste which is included in price. See Figs. 1, 2 and 3.

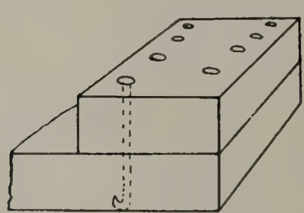


Fig. 4—Cleating.

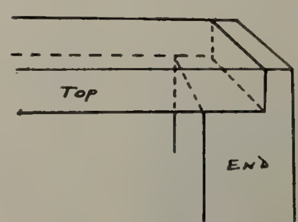


Fig. 5—"Set-in" tops.

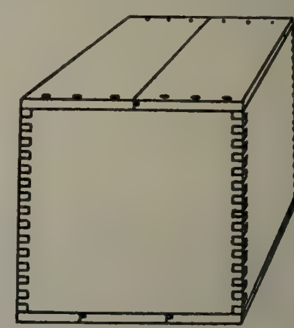


Fig. 6—The lock-corner box.

Clearing

Cleating as shown in Fig. 3 consists in reinforcing some part of a box by fastening a band of lumber or strip in by nailing usually in the corners and includes in accepted usage the clinching or turning of the points of the nails.

Dado Work

Dado work is brought into use in various ways, one

application which affects quantity of lumber consumed is illustrated by Fig. 3.

Board Measure Box Contents

Each part of the box is treated in shook state as so many pieces of lumber allowance made where one part laps another usually taking the next even inch or half-inch.

Box sizes are universally expressed by **inside measurement.**

The Lock Corner Box

To arrive at the quantity of lumber required for ends, add to the inside width of the box to permit of tenons passing through thickness of sides taking next even inch or half-inch above combined thickness. For illustration: If box is 13-in. wide inside and sides are ⅜-in. each or ¾-in. together in thickness use 14-in.

Multiply this by depth of box to next even inch for one-piece ends or half-inch for two-piece, thus if box is 11⅛-in. deep use 11½-in. Multiply the product of these two by the thickness from which two ends will be made; if 13-16 in. ends by 2, if ⅝-in. ends by 1½, if ½-in. ends by 1¼-in. This will give you board **inches.**

Sides—Take inside length plus thickness of both ends, multiply by depth of box to next even inch or half inch, multiply this by thickness of two sides—**inches.**

Tops and Bottoms—Inside length of box plus thickness of ends multiplied by inside width, plus thickness of sides (to next even inch or half-inch) multiplied by inch thickness of two pieces in the rough—**inches.** Add **inches** in sides, tops and bottoms and ends and divide the sum by 144 or multiply by the decimal .0069 which will give board feet.

The Nailed Box

Without cleats, same method of figuring as lock-corner, except ends do not include thickness of sides. See Figs. 8 and 9.

The nailed box, with two vertical outside cleats on each end. See Figs. 10 and 11. This varies from last box in that sides lap cleats and allowance must be made for thickness of cleats (to next even inch) in figuring sides. Also include lumber in cleats obtained by multiplying their length by their width by thickness by number in board derivation. Cleats on this style box sometimes lap the thickness of top and bottom. This box is also made with cleats inside in which case no additional lumber is required in sides on account of cleats.

Open Crate Composed of Strips

Figuring is same as for last nailed cleated box except that deduction is made for openings between strips or strips figured as such. See Fig. 12 and for construction see Fig. 11.

Nailed Boxes, Cleated Across and Up and Down Both Ends

See Figs. 13 and 14. In these tops and bottoms as well as sides lap or cover cleats and allowance must be made. In Fig. 14 the cleats must figure full width and depth as the amount cut away to mitre is wasted —(so far as customer knows). —Packages.

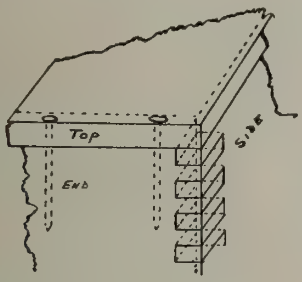


Fig. 7—Lock-corner construction.

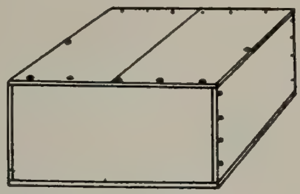


Fig. 8—Nailed box (not cleated).

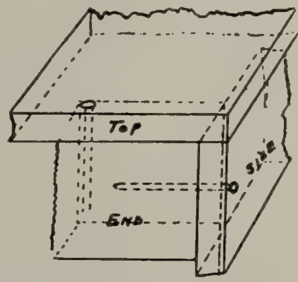


Fig. 9—Nailed box construction (not cleated).

A Very Old Bit of Cooperage

WHILE on a recent visit to New England the writer ran across one of those old-time dash churns which formerly performed a very important function in the dairy connected with some farm house.

This was evidently hand-made since the staves show varying thickness. It is three and one-half to four feet tall, a foot or more in diameter at the bottom and about two-thirds as large at the top. The cover is held in place by pins and has in its centre a hole through which the handle to the dash worked up and down.

The staves are of clear spruce, fully an inch thick, and perhaps four inches wide. They were first split from a straight-grained stick and then shaved with a hand shave. Two of them, on opposite sides project several inches above the others and have holes cut in them to enable their use as handles.

The women of the family used to stand by this apparatus and work the handle up and down until the butter came. They knew nothing of proper temperatures or the ripening of the cream to assist, and when

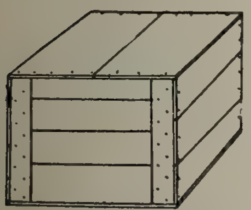


Fig. 10—Nailed cleated. Two outside vertical cleats.

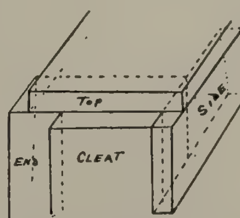


Fig. 11—Construction nailed cleated box.

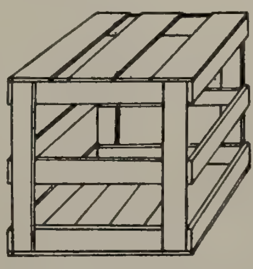


Fig. 12—Nailed crate. End cleated vertically.

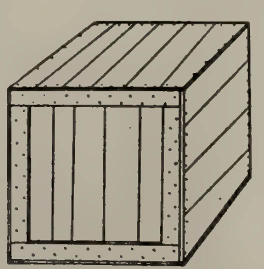


Fig. 13—Cleats square ends.

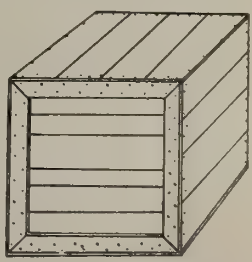


Fig. 14—Cleats mitred.

the butter did not come they would heat a horse shoe and drop it in the churn to exorcise the witches. The hot horseshoe raised the temperature and the cream would speedily turn to butter. The reason was scientific, but those otherwise sensible people believed in witches, and this was among their least harmful manifestations. Sometimes they repeated this:

Come, butter, come,
Peter stands at the gate
Waiting for butter cake,
Come, butter, come.

The man who made this churn did a creditable piece of work. It is perfect to-day, and in case the creamery failed to deliver its supply could easily be utilized as of old.—The National Cooper's Journal.

The Cooperage Trade

Cooperage trade conditions and prospects are discussed optimistically by Mr. James Innes, of the Sutherland-Innes Company, Chatham, Ont., who reports as follows:—

There has been quite a little flurry in the demand for apple barrel stock this month caused by the heavy demand for apples. Manufacturers and dealers who could make quick delivery at eastern points, got rid of practically everything they had, but there is still quite a quantity of apple barrel stock left in the South which could not reach the Eastern market in time and will have to be carried over for another year or be utilized for other purposes than apple barrels. Prices were not affected to any extent except parties who had stock on the spot could make immediate delivery, get good fair prices, much higher than have prevailed this year. There is still some apple barrel stock to be used and will be for the balance of the month, and the aggregate is considerable.

The demand for stock generally throughout the country has been a little quiet. Flour barrel stock has been in a little better demand and indications are that they will be heavy for flour barrel stock from now to the close of navigation on the Great Lakes.

The preserving season has also caused a better demand for sugar barrel stock, but it has not been as heavy as usual at this time of the year. There has been quite a drop in the price of gum staves over spring prices, but the indications are that things will stiffen up again very shortly.

Hoops are certainly considerably off at the present time. The stocks are comparatively light and there is no reason for manufacturers cutting prices the way they have been doing the past month or six weeks, as those who are holding their hoops will certainly get better prices during the winter and spring than they could get at the present time.

Heading prices continue firm. Basswood heading is in good demand. In fact, the demand is greater than the supply, while hardwood and gum heading remain firm, and the only falling off in prices has been in stock suitable for the apple trade, some cheap mill run and No. 2 heading being offered on the market recently.

All indications look forward to a good winter trade, and manufacturers who were a little blue two or three weeks ago are now perking up and cannot see any reason why they should not get all the business they need this winter.

Stave Outlook in England

AN early fall review of the outlook of the situation in England says that the stave market for next year is still rather quiet. After the first burst of activity in selling, during which prices rose to $35 for cement sizes, and to as much as $37.50 and $38 for Cornwall and special dimensions, buyers appear to have become rather nervous, and for the most part have refrained from further purchases. Sellers, on their side, have shown a firm front, and are quite unwilling to accept anything less than the highest figures hitherto made—indeed, one of the most recent contracts has been closed at $36 for 28 x ½-in. The position, however, is a little difficult to judge, as the leading stave firms have from the start held rather divergent views as to the wisdom of purchasing at advanced prices for next year, some having speculated largely, and others having refrained altogether, preferring to wait for the cement companies to make a move before taking any risks.

Salt Staves a Sawmill By-Product

Staves for salt barrels are better if made narrow, because salt draws dampness and the staves being constantly wet are inclined to swell. Wide staves buckle, but narrow ones hold their shape. It has been found profitable to work slabs, crooked logs and other waste pieces about sawmills into such staves. Pine is satisfactory both for staves and heading, and this wood is often abundant about many large mills. The annual production of salt in the United States exceeds 33,000,000 barrels, but only a portion of it is shipped in barrels. The demand for such barrels, however, is very large, and since a container for salt is like the cement barrel in that it never comes back, the demand must be met from new stock every year. Some salt staves are cut with cylinder saws, others with straight saws. The extra narrow widths that answer this purpose need not be cut on the curve.

Plans for a Small Factory Building

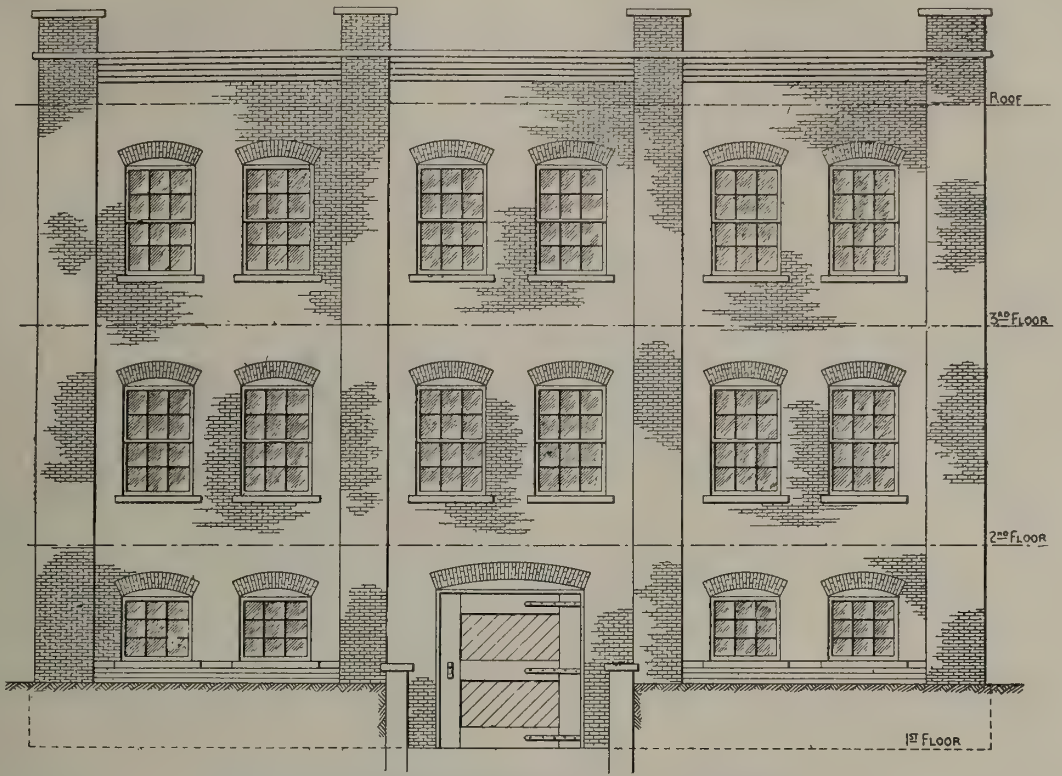
PRESENTED herewith are plans for a building which it is believed will be found suitable for light manufacturing purposes. From considerations of economy, durability and permanent effect, brick has been selected for the walls. The building is designed to conform to by-laws which require 17-in. walls for the first and second storeys and 13-in. walls for the third storey. The roof load is 30 lbs. per square foot and the live floor load 120 lbs. per square foot.

The foundations are shown made of concrete, but brick or rubble masonry can be used, and should be laid in cement mortar.

The roof has a pitch of ¾ in. to one foot and is covered with a five-ply coal-tar pitch felt and gravel roof laid on 1¼-in. tongued and grooved stock.

Fig. 2 shows the plan of the second and third floors, giving the spacing of the columns and beams. The roof beams and girders are spaced to the same dimensions as for the floor beams. Cast-iron column caps should be designed to allow floor and roof girders to have a good bearing, also a cast-iron column base with a bearing surface 2 ft. square is required for the first-storey columns, size of bearing surface of base should be 2 ft. square.

The first floor is constructed by putting down a 6-in. layer of cinders and then covering them with a 2-in. layer of tar concrete, laid while hot. In this concrete mailing strips are imbedded to which a 2-in. floor of roof boards are spiked. Upon this rough floor is then laid a finished floor of 1¾-in. boards. The outside of the building is the same on all sides, as the structure is square, with the exception of the door, which is to be located on one side only, the other sides having windows at that place. The outside door should be made



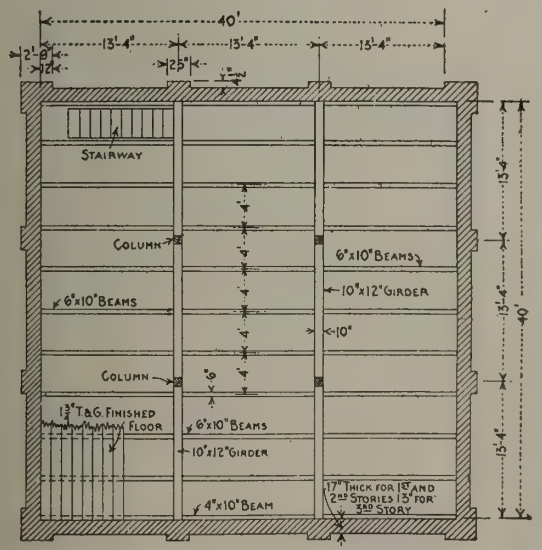
A plan for a small factory building for light manufacturing purposes.
Fig. 1—Front elevation.

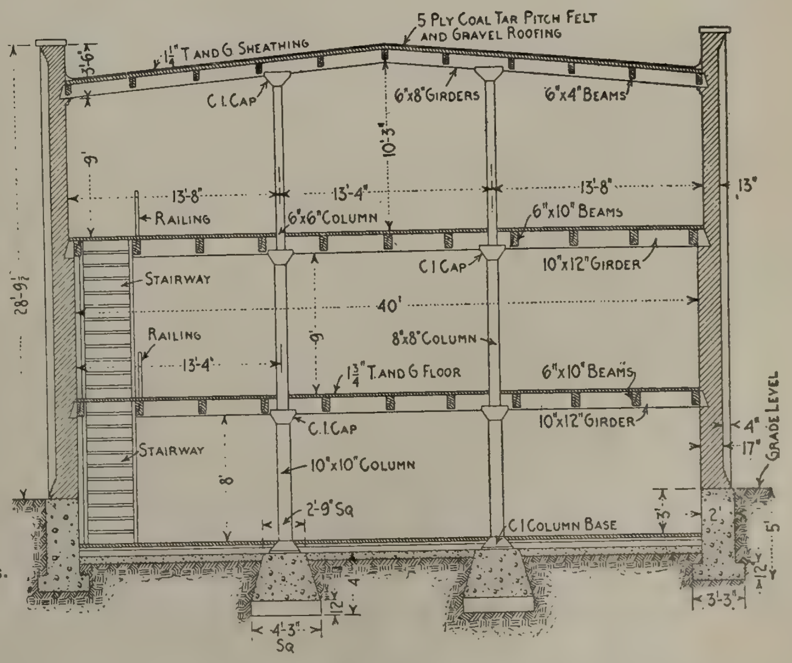
large enough to pass through it all the supplies and machinery that will be used in the building.

At a certain point in the second and third floors it might be necessary to space the beams differently than shown in Fig. 2, so as to be able to hoist the machinery from the first floor to the upper floors, or provide a large door in the outside wall at each floor.

As the level of the first floor is 3 ft. below grade, it is necessary to provide a wall around the entrance and so made that no water from the grade level will wash down to the first floor. Steps to the floor level from grade will also be necessary. If this kind of entrance is not desirable it might be better to enter the building at the second-floor level and have steps going up from grade level.

The outside surface of the concrete wall foundation should be coated with coal-tar pitch to keep moisture from coming into the first floor.





On the left, Fig. 2—Plan of second and third floors.
On the right, Fig. 3—Vertical cross-section, showing construction.

The N. T. R. Woodworking Plant at Quebec

Interesting Constructional Details in the Design and Erection of Freight Car Shop, Planing Mill, Dry Kiln and Lumber Shed

NOTEWORTHY among the most recently established industries of Eastern Canada are the Leonard Locomotive Shops of the National Transcontinental Railway at Quebec. Readers of the Canadian Woodworker are identified with this important enterprise owing to the fact that an up-to-date woodworking plant has been established and will shortly be in operation. The following article is devoted mainly to a consideration of the constructional features of the woodworking plant. At a later date we hope to publish a supplementary article comprising a description of the design of the plant, the layout of the machines and the equipment installed. In passing, it may be said that the general layout of the shops shows that not only has convenience of operation governed the design but that due regard has been had to future needs. The Commission evidently realizes that lack of such regard has been productive of scores of expensive mistakes throughout the country. Each shop is capable of extension without interfering with the work of any other. Additional facilities can be installed in any department as occasion may require. We are endebted to the Secretary of the Transcontinental Railway Commission for the following particulars:—

The Freight Car Shop.—This shop is to be divided into two departments, one for the repairs of steel cars and the other for repairs to wooden freight cars of all kinds. These can be repaired or built. The shop itself is to be 129 ft. 6 in. wide by 284 ft. 6 in. long. It will be composed of a self-supporting steel frame, resting on concrete foundations. The walls are of brick and the roof wood, covered with prepared roofing. The floor is of grease-resisting Mastic asphalt flooring, one and one-half inches thick, laid on six inches of concrete. The glass used is known as ribbed factory glass and that in the skylight is heavy thick ribbed wire glass which prevents the falling of fragments in case of breakage.

The shop is divided into three bays, two of which, next the walls, are about 22 ft. wide. One of these is served by a 10-ton overhead electric crane, and there in one standard track below it. The centre bay, about 80 ft. wide, is served by a 25-ton overhead electric crane, below which are four standard tracks. The remaining bay, 22 ft. wide, has one standard track with an industrial track in the centre.

The equipment of this shop will be equal to any of its kind in the country. It will be well lighted and ventilated and heated by a direct heating system.

The Planing Mill.—This building is to be 81 ft. 6 in. wide and 264 ft. 6 in. long. Like the freight car shop, it is built with self-supporting steel frame and brick walls. There are two standard gauge tracks entering this building, and industrial tracks are provided for the transportation of material. In the centre of this building there is a lean-to used as a lavatory, with a floor 10 ft. above, on which is placed the heater fan for the direct steam system, which is supplied at about 2 lbs. pressure. A separate drinking water system has been provided in this and other shops of the Leonard plant. The woodworking machinery has not yet been fully decided on, but the various tools and appliances will be of the latest and most modern design. This building is conveniently located near the power house so that shavings, etc., can be forced by a fan system to the boilers of the power house.

Dry Kiln.—The drying of lumber is an important feature in shop operation and in this instance a dry kiln 71 ft. 6 ins. by 38 ft. 4 ins. has been provided. It contains two standard gauge tracks, not for the use of railway rolling stock, but the outer rail in each case does duty in connection with four industrial tracks, each 2 ft. gauge. The building will have brick superstructure walls, concrete roof, sides and ventilators. The concrete floor is 6 inches thick and is suitably drained. The heating is arranged for exhaust steam supplied at atmospheric pressure.

Approximately the total heating surface is 1,860 square feet of radiating surface or about 3,000 lineal feet of 2-inch pipe. The heating coils are, of course, placed in concrete pits below the level of the floor. There are ten coils in all, one being below the central gangway, in each half of the kiln, the other eight are below the industrial tracks. The floor is composed of expanded metal in sections 4 ft. long set on 2 x 2 x ⅜ angle frames.

The control cabinet containing valves, thermometer, vacuum gauge, etc., is outside the building, so that the condition of the kiln can be ascertained and alteration of heat arranged for without opening the main doors. Each half of this building is a separate unit. A central partition and ceilings permit one side to be used without the other. Outside the building at each end, there is a concrete platform and at the ends there are small transverse pits with short transfer tables for moving the lorries upon which the green and the dry lumber is taken to, and removed from, the dry kiln.

Lumber Shed.—This is an ordinary wooden frame building on concrete foundations and sills, drop siding walls, wood sheathing roof, with ventilators, skylights and prepared roof. The floor is 2-inch spruce, on joists of hemlock or red pine sleepers, bedded in 2-inch gravel. The building is 225 ft. 6 ins. long and 40 ft. 6 ins. wide. There are sixteen skylights glazed with ⅜ in. thick ribbed wire glass. There is one standard track in the centre of the building and the ends are fitted up with sliding doors.

The Leonard Shops.—The National Transcontinental Railway plant at Quebec has been officially named the Leonard Locomotive & Car Shops. They have been called after Major R. W. Leonard, Chairman of the Commission, during whose administration the work of constructing the railway will have been brought to a successful conclusion. The contract for the entire plant was awarded to Mr. Joseph Gosselin, of Pt. Levis, Quebec, and work is now under way. The layout of the plant has been done under the supervision of Mr. Gordon Grant, Chief Engineer of the Commission.

The work of designing, laying out and planning the whole plant, as well as the equipping of the various shops with machinery and appliances, has been entrusted to Mr. W. J. Press, Mechanical Engineer of the Commission. Mr. Press designed, laid out, and built the National Transcontinental Railway Shops at Transcona, near Winnipeg. These shops are now in successful operation and the Leonard Shops at Quebec will be equipped in the same up-to-date manner and will thus be capable of very economical and efficient operation.

The Object of Sandpapering

IN these days of flat enamels and special undercoating which are represented by manufacturers as requiring little or no sandpapering, it is perhaps worth while asking whether this can be so. Doubtless the smooth surface given by these materials necessitates less rubbing down than was formerly the case, but it must be remembered that smoothness alone is not the object of sandpapering. Smoothness, essential though it is to all good work, is in a sense subsidiary to that of forming a "key" for the following coat; hence sandpapering in some degree will always be necessary. There are flat enamels on the market which feel perfectly smooth to the touch, but which, nevertheless, do not on that account form a good "key" for future coats if left unsandpapered; for, as every decorator knows, such surfaces are frequently too hard to allow of a proper amalgamation between themselves and a superimposed coating, hence require to be abraded gently with sandpaper to remove their hardness. In the case of an oily ground for an ordinary flat paint finish, sandpapering is not, however, required to give a "key" as the comparative softness of the oil paint is acted upon by the turpentine in the flat causing thereby amalgamation to take place, but even here rubbing down is an aid, and helps to bring about a smoother effect, if not still better union between the coats. From this it follows that though newer and, let us hope, better materials are now produced requiring less rubbing down, the necessity for that operation is by no means done away with and probably never will be. If the proper application of paint is needful to good work, so is also that of sandpapering, and despite modern assertions to the contrary, the fact should not be forgotten where good and permanent work is required.

If the first revolution of a freshly-sharpened band saw dulls it more than two hours' hard sawing afterward, it is up to some ingenious man to invent a way of disposing of this first revolution and starting in on the second. However, let us all be agreed that the first revolution is harder on the saw than some of the others.

Cementing the Joints of Belts

THERE has been considerable discussion in the mechanical papers lately concerning the best coating for belts that have to be cemented at the joints. The subject is important, for belts that slip are as wasteful of power as a slippery locomotive. We have had experience with several coatings, but none gave so much satisfaction as the following:

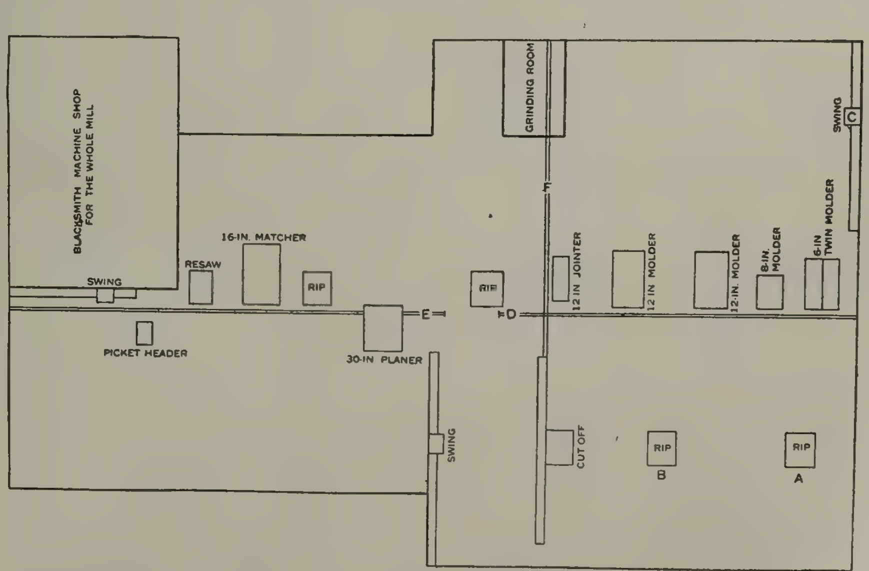
Take a good glue, add American isinglass equal parts by weight; place the material in a gluepot and add sufficient water to cover the whole. Let the mixture soak ten hours, then bring the whole to a boiling heat, and add pure tannin until the whole appears like the white of an egg. Apply warm. Buff the grain of the leather where it is to be cemented, rub the joint surfaces solidly together, let it dry for a few hours, and the belt will be ready for use.

Tannin or tannic acid is an astringent substance used in converting hides into leather, and produces a surface on a cemented belt similar to the original leather.

Plan of an Economical Planing Mill

AN economical and practical planing mill plan is given in the accompanying illustration by S. P. in the Wood-Worker. The main lineshaft is below the floor, placed in a tunnel 12 ft. square. All of the machines are run with belt-tighteners except the two rip saws, A and B, and the cut-off, C. Each is run by direct motor. The lineshafts, D and E, are run by two 30-h.p. motors. The lineshaft F is overhead and run by a half-twist belt from lineshaft D. Shaft F runs a swing cut-off and a railroad cut-off, also the ginding room. Two 60-in. fans take care of the shavings; they are driven by a direct-connected motor.

The shop is well lighted, both with windows, skylights and swinging doors. The floor is of concrete, making an ideal machine bed, on which trucks are easily managed.



Plan of an economical planing mill.

Millwrighting and Machine Woodworking

By Alexander T. Deinzer

DID you ever visit a woodworking plant and have the manager tell you they have the most modern plant to be found anywhere and then on going through the factory you would discover loose pulleys rattling, belts poorly laced, saws with bull's-eyes on them, and things in general neglected?

This is by no means uncommon in small factories where the foreman is expected to do about everything in this line in addition to handling perhaps thirty or forty men. In other words, the foreman is supposed to do the work of three or four men. Should the boss perchance find an employee idle or out of work the poor foreman is again to blame. If, Mr. Reader, you are a manager, do not think for one moment that your foreman has not enough to do and impose other duties upon him. If your foreman has much spare time there is something wrong some place and it may behoove you to investigate. If you would but take your foreman's place for a week or ten days you would soon learn to appreciate that the job of being a foreman is no snap after all, and you may wonder how he can carry out the details of his work and do the millwrighting for the entire plant.

Engage a first-class millwright. If your plant is too small to afford this, have one of your expert machine men do this work. Well, what should a first-class millwright do and be able to do?

Let us discuss briefly the shafting equipment of the mill. We know that the shafting equipment of a mill is its roadbed for power. Every first-class millwright is therefore very careful when he is putting up shafting to get it level and in line. Even a man who is quite unskilled will make an effort to do likewise and if asked why will promptly answer "So it will run easily."

Expense of Error

Everybody seems to realize unconsciously that a shaft supported by a number of bearings should comply with these conditions, and yet it is decidedly hard to say in a theoretical way just how much harm, just how much extra friction, is caused by a given shaft that is out of line by any certain amount. To figure a given case might be possible at least in an approximate way, still it would be necessary to take into consideration such a number of factories that we might feel rather doubtful of its practical utility.

The least total pressure on all the bearings, in the case of a rotating shaft, is attained when the axis of all the bearings forms a straight line. Friction fundamentally depends upon the pressure between the friction surfaces, and therefore no matter how much attention we give to the grade of oil used, the style of bearing, speed, etc., our first thought should be to see that the pressure of the load is reduced to the lowest practical limit.

Too Busy to Babbitt

I recently visited a furniture plant and was very much surprised to find they were operating with a wabbly lineshaft. I called attention to this and learned that the shaft had been operated just that way for a number of years. All that was necessary was to re-babbitt one of the boxes, but the millwright was too busy to bother with such a thing. He would very likely do this job when he had nothing else to do. Imagine the power wasted. Turning shafting requires at best a considerable amount of power and a poorly hung line causes greater waste than is usually realized. Of course, friction is not altogether due to the shafting, that is, the pressure at the boxes, but is also due to the tension of the belts. This includes all belts running on idlers, but the principal amount of friction can be traced directly to the result of the present antiquated and insufficient method of aligning and leveling the shafting.

Someone has said "Friction is the highway robber of mechanical energy." It is safe to state that the most flagrant abuse of power in the average plant can be charged to lineshafting. The neglect of this detail and the indifference of many mill managers to this great fundamental of all manufacturing is almost criminal when one considers not only the money wasted because of it but the tremendous influence it has on the quality and quantity of the output.

Most new shafting is erected reasonably near the level and in line, but this is usually before the pulleys or belts are put on, and often before the floors are loaded with the machines they are to carry. Loading the floors causes them to deflect more or less, and in the case of floors of light construction this may cause a serious disturbance of level.

When buying knives, insist and in fact see, that only the best steel has been used. It must have the right amount of carbon and other ingredients to develop sufficient hardness and toughness. We know that in hard steel grinding, the grinding may heat the knife but it will not draw its temper. We also know or should know that after the temper has been drawn by overgrinding, the edge becomes soft, requires continual filing and the life is sapped out of it.

Great care should also be exercised in the selection of the proper emerywheel. Progressive emerywheel manufacturers study conditions at your plant, and if you will but give them a chance they will make suitable wheels to give most efficient results. Grinding troubles are very unpleasant; however, we can and should eliminate this trouble where and whenever possible.

It is absolutely impossible to arrive at satisfactory results on any handsawing machine unless suitable tools are provided for keeping the saws in order and a suitable place provided for doing the work. It is possible, where a firm desires to use only one hand resaw or one band ripsaw, to do a great deal of the work by hand and thus not make a very large outlay for filingroom outfit. Unless you can afford to provide what tools are absolutely necessary and a suitable place to do the work, you had better not go to the expense of putting in a band-saw, as you will only make trouble for yourself and for the manufacturer of the machine.

Cause of Saw Cracks

I recently read an article calling attention to the fact that a heavy tension will cause saws to crack, but the author said that more cracks are caused by too little tension than by too much. His rule of tension is this: "Put in all you can, and have it lie down on the bench fairly well. It must lie down flat or else it will not be able to straighten itself out when it should, between the wheels where it is making a cut. The amount, of course, will vary according to the thickness and temper of the steel, but the above rule will fit all

saws." Increasing the tension makes the saw "stand up" to a faster feed.

We have stated in this paper that when buying knives you should see that the best steel has been used. This also applies to bits, drills, etc. All drills and bits should be carefully inspected as soon as they arrive at the factory—and not six months (as is done in many cases) after the bill is paid. This should be one of the duties of the millwright in a small factory. It is unnecessary to state that bits must be sharpened properly if efficient results are to be obtained.

Prepare for Emergencies

Always carry a large stock of band-saw blades, all sizes, for emergencies. The one unpleasant feature about the bandsaw machine is the breaking of saw blades. It takes time to mend these blades, and it is therefore more economical to immediately replace the saw than to compel the operator to wait until the millwright or sawfiler repairs or brazes the saw. Every millwright knows or should know how to braze broken bandsaws; suggestions along this line would therefore be unnecessary. When filing see that all teeth are as far as possible of uniform size. To secure this evenness in length, nothing better can be found than a reliable filing machine, in which case the filing will be as nearly perfect as can be and, each tooth being equal in size, the strain will become uniform throughout the entire length of the blade.

A method now commonly used for babbitting boxes is suggested especially to the beginner; remove all old babbitt from the bearing and wipe it clean of oil and dirt. Cut two cardboard collars to fit the shaft, and slip them on up to each end of the bearing to be poured. If they cannot be slipped on over the end of the shaft easily, they may be cut apart and spread enough to slip over it anywhere. Pour the upper and lower boxes at the same time. This may be done by cutting small V's in one edge of the liners next to the shaft. Be sure that there is no trace of moisture in the bearing after it is ready for the pouring. Clamp on the cap, slip the end collars up, putty them properly and build up a funnel of putty around the oil hole, through which the metal is poured. When it has cooled, remove the end collar and carefully drive a thin cold chisel under the cap from both ends, which will break the connection of babbitt holding the top and bottom together. Always use a mandrel for babbitting (especially planer bearings) and keep the shaft journals in such shape that they will fit the bearings cast from mandrels. See that the shaft has some end motion. A shaft without end motion hardly ever runs as well as where the journal can traverse endwise a little. Where the fit is so blamed good around the journal that there is no room for oil between the journal and bearing, then heating is the sure result.

The question of belting is of great importance in most woodworking plants. Good power and machinery in your plant are not enough. Much that should be attained has been lost by the use of improper belting.

The general opinion has always been that the correct way to put spliced belts on pulleys was to place them so that the splice or joint would run on the pulley side and against the splice on the outside of the belt. The inside can take care of itself, as the joint is kept smooth by the contact and pressure of the pulleys (especially is this the case where any belt dressing is used). It is always the outside of a splice that opens up and causes trouble. In running over the pulleys the tendency is to open the splice on the outside and close it on the inside. After the thin edge once starts to open, the air is forced under it (as it runs thin edge first on the outside) and it soon becomes detached. Instead, splice belts should be run with the splice on the pulley side, so as to offer no resistance to the air on the outside of the belt.

There are many kinds of belts on the market, as for instance fabric, cotton, rubber, leather, etc. Ox leather belts stand at the head of those of all other materials for the satisfaction of all demands on belts. No other belts will stand the shipper. Cotton belts are weakened when wet; rubber belts are rotted when oiled; but leather will stand wet and dryness, cold and heat, and last a long time even when oil-saturated.

Sometimes too high grades and too expensive belts are used; sometimes a heavy belt is purchased when a lighter one would answer the purpose; sometimes a double is put on the pulleys when a single would be better.

Study of Belt Stretch

A study of the stretch of belts and the frequency with which they require tightening, and the portion of their life during which they require repairing, leads us to the conclusion that there is an elastic limit to belting, to a certain extent analogous, as far as it affects the life of the belt, to that existing in iron and steel. Leather belting stretches somewhat more than 6 per cent. of its original length, and during the first six months of the life of the belt more than one-third of its total stretch will occur, when working under a full load. It will stretch under those conditions about one-half of 1 per cent. of its entire length before requiring to be tightened.

One great, yes common, fault in many factories, is to run belts so loose that they cannot take the speed, feeds, and depth of cut for which the machines were designed, and that the tool will stand. Do not run your belts too loose; you are experiencing as much loss as you would by having them too tight.

The millwright should have a place for everything and everything in its place. I have seen much valuable time lost owing to carelessness of the millwright. Have a place for every tool and know where to find the tool when you require it.

The millwright should be a manager and should put all he knows to good use. True, mechanical knowledge is now easily obtained. Much valuable information is given in our trade journals. The workman of old could excuse his ignorance of the higher branches of his trade by saying that he had no means of acquiring a knowledge of them. Today much better information is published but too few go after it. Again we find men who subscribe to trade journals but they do not find time to read them. Our children are taught from textbooks—our textbooks should be the live trade journals and we should be as anxious to receive them as we are our evening's paper. Yes; we should not only read every article but offer suggestions to our fellowmen seeking information.

There are several varieties of cleated boxes made, but the two main divisions are those that are nailed solidly together and those that are hinged at the corners for packing and re-shipping. The trade is growing rapidly in both lines and on all sides we see more cleated boxes than ever before. This is a point worth keeping in mind. It also carries with it the idea that this gives an opportunity to use up many of the narrow widths and short lengths in lumber around the planing mill where boxes are made as a side line.

The Mahogany of Western Africa

Sources of Supply, Characteristics of the Wood, and Difficulties in Getting it Out—Demand for Mahogany Steadily Increasing—The Chief Varieties

By James A. Weale

MAHOGANY easily holds the field as the premier furniture and fancy wood. In this respect, it may be said to possess an incomparable combination of properties, and may be employed with confidence for almost any ordinary purpose. It varies much in texture, color and utility, according to the district where it is produced, and each district exhibits consistent features peculiarly its own. Botanically, mahogany belongs to the Meliceae, an extensive order distributed throughout the tropics. It may be divided into four tribes, of which the following are well known and representative:

1.—Melieae, the Eastern Margosa tree; 2.—Trichilieae, the crabwood of Demerara; 3.—Swietenia, the mahogany from San Domingo; 4.—Cedreleae, the cedar employed for cigar boxes.

In cutting mahogany no care is taken to get all there is in the tree. This is a sample of how some of the best material is left in the spreading stump. If it does not rot out, some day it will be utilized for choice veneer.

The original source of supply appears to have been the West India Islands, and the story of its introduction to commerce is romantic. Its merits were readily established, and the demand has since been steadily progressive. The export from the West India Islands has been gradually declining for some years, owing to the accessible cuttings becoming worked out. That from San Domingo is the most highly esteemed, but the logs seen today are mostly of small size and badly made. Nevertheless, they command the highest relative price. The timber from Cuba is slightly inferior in value to the San Domingo, but these two kinds may be said to stand forth before all other kinds, eminent and distinct. To be precise, the West Indian mahogany is the only species entitled to the name, being the true Swietenia Mahogani of Linnaeous.

The Different Kinds of Mahogany

Several kinds of mahogany are exported from the mainland of Central America. These seem to be species of Cedrela, but their identity has not been authoritatively determined. That from Honduras is the most valued, whilst that shipped from Tabasco comes next. The timber from these points is held in high estimation, and for ship-building and high class cabinet work are constantly specified. The logs are generally of moderate to large size, well squared, with a texture mild, yet firm. The color is rich and naturally darkens on exposure to light. What few shipments that come to hand are readily absorbed into consumption.

So great has become the demand for mahogany that the opening of new fields of production has been found imperative, and the greater part of the world's supply is now drawn from West Africa. As a source of timber supply, West Africa offers an invitation to enterprise unexampled in the history of the hardwood trade, and the import of mahogany, although already of huge proportions, may still be said to be in the embryo stage. Twenty years ago, African mahogany was practically unknown. In 1895, Liverpool imported 3,500,000 feet; in 1900, 14,000,000 feet; in 1906, 21,000,000 feet, and it is estimated that in 1912 will be no less than 40,000,000 feet. The surprising feature is that even this enormous quantity is quite insufficient for a demand that appears insatiable, and prices today have reached a level never before attained. The competition for the wood in the auction-rooms is incredible to one who has never witnessed it, and the logs are no sooner piled in the brokers' yards than they are sent away again. One may indicate with confidence that if the supply were twice as great, it would have no effect upon the values. When this statement is considered with the fact that mahogany shipment is highly profitable, it may appear an economic anomaly. In most industries, the prevalence of large profits stimulate production. Not so with West Africa. It is a difficult country, and no shipper could possibly double his output in a season. The conditions are vastly different to those obtaining in the temperate zone, yet the difficulties are not insurmountable when understood. That fortunes have been lost in West Africa cannot be denied, but timidity and ignorance are very largely responsible. The core of the matter is that it is no country for a principal himself to live in, and men with knowledge and judgment who can be depended upon are difficult to find. West Africa has a bad name. A century ago it was christen-

The log is carefully squared to facilitate its shipment.

ed the "white man's grave," and its evil reputation still clings, though without equal justification. It is no paradise; but, generally speaking, life is no more precarious than in any other tropical country. A man is simply required to modify his habits in sympathy with the climate. Medical and sanitary science, during the past few years, have worked wonders, and residence today is attended with tolerable comfort. The lot of the lumberman in West Africa is more to be envied than

The logs are slashed as here shown before the slab is removed to get them ready for shipping.

that of his fellow in Canada, and when this becomes more readily recognized, we shall see the country entering upon a new era of progress.

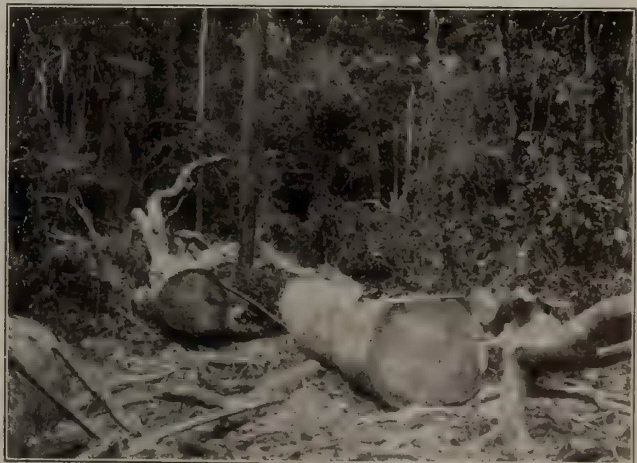
What Adds to the Cost of Mahogany

There are two other factors that retard the development of mahogany. No need to mention the climate. That will always be present. Firstly, the scarcity of labor; and, secondly, the lack of mechanical appliances for the extraction of the timber. In very few instances is the labor at hand on the spot. The routine of the indigenous nigger is his daily feed of "fu fu" and his sleep. The hard work conjures no idea in his mind, and labor is regarded as the chief function of the softer sex. Shippers have to import the "boys" mostly from the Kroo coast. A gang of from fifty to seventy is hired by contract under the supervision of a "headman." The rate of pay is from fifty to seventy cents per diem each, food found, and free transport at the beginning and end of the season. When the venue of operations is settled, the trees are felled and squared by men accustomed to the work. Haulage from the stump to floating point is about three logs per day, costing, say, about $12 per log. The average log will contain about 600 board feet, so that extraction under favorable conditions is about two cents per board foot. To the shipping point may be anything from ten to fifty miles, but as the floating is done when the rivers are in flood, this expense is very small. It is certain that with the assistance of suitable mechanical appliances, the cost of getting the logs could be almost cut in two. At present, when the log is squared, it is simply hauled out by sheer brute force. With the exception of the occasional use of a tree branch as a lever, the natives have no idea of anything but muscle. Various devices have been suggested, but without avail. The "boys" will use them when the white overlooker is watching, but as soon as his back is turned, they come back to their own primitive methods. Imagine sixty niggers hauling a five-ton log. Clamouring with an indescribable jargon, falling over one another, happy one moment and quarrelling the next, urged on by the "headman" in his mother tongue, and the white with language of the most ultra abasco variety. Surely timber can be brought out of the bush simpler than this.

When the logs get to the final shipping point, there is another difficulty. Ship-room may be available and it may not. The logs may sit for days, perhaps for months. If left in the water, it is liable to worm. If hauled upon the beach, it deteriorates with the sun. There are no harbors in West Africa. The logs must be towed out to the streams from one to three miles. If the surf is bad, they cannot be got away at all. For this reason, little success can be hoped from attempts to ship complete cargoes. The products of West Africa must always be dependent upon a coasting service. The ships take general cargo out and bring general cargo back. When the steamer leaves one point, the intelligence is telegraphed to the next. Preparations are then made to set off with the goods the vessel is said to be able to accept. This is done by canoes or towage, or in some places by lighter. The rate of freight to Europe is low and accommodating. It runs from $6 to $9 per ton of 2,240 pounds. It does not appear to be regulated by mileage, as the rate from the more remote points is usually the cheapest. It is regulated by the ship owner who considers many other products, their volume and availability. Practically, the cost of mahogany to the quay in Liverpool or London may be said to be in the region of six cents per board foot. It may vary slightly either way, according to the difficulties of the district from which the logs are derived.

One Source of Profit

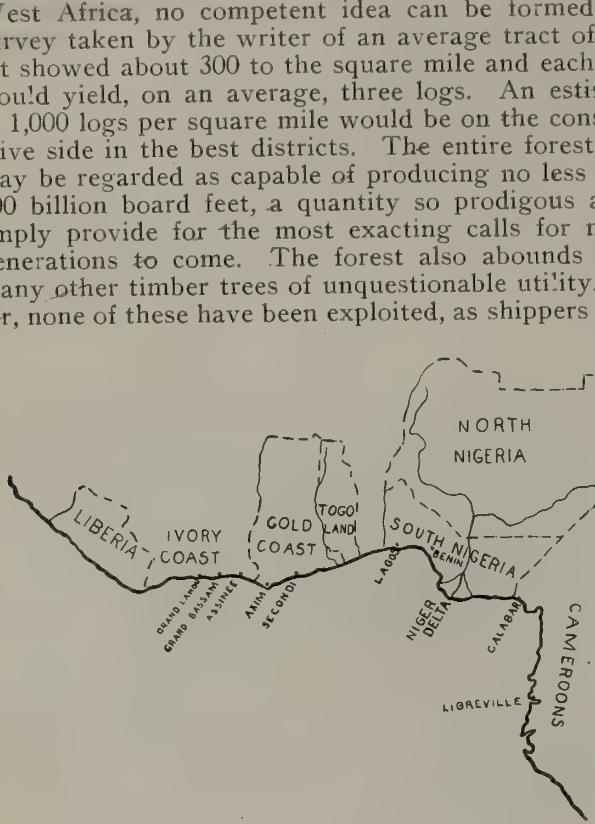
A considerable avenue of profit comes to the shipper from figured logs. These cost no more to bring to market than logs of the cheapest class. A figured log may bring at public auction up to $3 and $4 per board foot. Such is like a nugget of gold to the fortunate finder, while the plain mediocre logs will at least command the cost of their acquisition. Right along the line we also have to consider that the waste in the preparation of mahogany is almost criminal. This is a point of supreme importance. A round tree containing 300 cubic feet should yield a square log of, say, 200 cubic feet. The native, however, by reason of his wasteful methods, seldom produces one of more than 150 cubic feet. This log is sent to Liverpool where the broker's mahogany rule still further



There is enormous waste in cutting mahogany, as witness this stump, which some day will yield choice veneer stock.

reduces it to 100 cubic feet. So that for 300 cubic feet given by nature to the shipper, he is only paid for a third that quantity. In the protograph designated as No. 1 will be observed the huge stump which is just left to rot in the ground. This one contained at least a carload of lumber. The day will come when shippers will return to these just as the gold seekers came back to the vomit of the old mine with the cyanide process.

Regarding the quantity of mahogany available in West Africa, no competent idea can be formed. A survey taken by the writer of an average tract of forest showed about 300 to the square mile and each tree would yield, on an average, three logs. An estimate of 1,000 logs per square mile would be on the conservative side in the best districts. The entire forest belt may be regarded as capable of producing no less than 400 billion board feet, a quantity so prodigous as to amply provide for the most exacting calls for many generations to come. The forest also abounds with many other timber trees of unquestionable utility. So far, none of these have been exploited, as shippers have



Map of the Mahogany region of Western Africa.

devoted themselves entirely to mahogany. To sum the matter up, the resources of West Africa are almost inexhaustible, its potentialities inconceivable, and its future beyond doubt.

The accompanying map will give a fair idea of the distribution of mahogany in West Africa. The timber from the Ivory coast is in the greatest demand. This wood is not floated and, consequently, has a bright and attractive appearance. The logs are of the largest average size imported, and average nearly 1,000 board feet per log. To one who understands the timber, the wood from Assinee and Grand Bassam is always charming. Long in length, heavy in depth, rich in color, and frequently figured, it is the finest variety of African imported. We may say to any buyer: "It is always safe to buy the timber from the Ivory coast on competitive bidding."

SHEARINESS in paint is connected generally with inside work where flat paint having a fair proportion of turps is used. It results from the fact that turps tends to make paint dry flat, and oil to make it glossy. If a half-and-half paint is spread on a surface unequally, it will usually dry sheary. In drying, the turps evaporates and leaves an unequal film of oil. Where it is brushed out sparingly it will dry flat, and where full, glossy. This is accentuated where the ground is absorbent, as on repainted inside work finished in one coat over a surface which has been limed and rubbed down with lump pumice. In flatting the work has a tendency to look sheary when worked on too much and where "overlapping" occurs. In repainting, two coat work is not so apt to look sheary. Briefly the cause is due to unequal mixing of the paint, unequal spreading or faulty nature of the ground, and working too much with flat color.—Australasian Decorator and Painter.

Just How Varnish is Made

VARNISH is composed of three essential ingredients—gum to give hardness and luster—oil to impart elasticity, and a solvent or thinner to keep it in a liquid state. After the varnish is applied, the solvent evaporates and the coating of gum and oil remain behind—thus these two materials have the most important bearing on varnish quality. There is also another ingredient present in almost all varnishes—"dryer," usually composed of lead and manganese. It is almost invariably added to the oil before the varnish is made and varies according to the kind necessary to produce required results.

Fossil gums are used for the best varnishes and are the hardened sap of trees that lived thousands of years ago. The sap ran upon the ground, hardened, became covered with decayed vegetation and fossilized. Today it is found several feet below the surface of the earth. The gum known as kauri is the chief and most widely used. There are so many grades of each kind of varnish gum that it means absolutely nothing to you when a manufacturer claims that he uses a certain kind of gum. For instance, kauri gum varies from fourteen to eighty cents a pound. So you see that it is not what the manufacturer says is in the varnish that counts, but the quality of the materials and, most of all, what the varnish will do.

The oils used for varnish making are chiefly linseed oil and china wood oil, specially prepared and well aged. The solvent is chiefly turpentine.

In the manufacture of varnish, the varnish maker first melts the gum over a coke fire in a copper kettle. When the gum is properly melted, the oil which is hot, having been separately heated, is added. The critical point in the entire process of varnish making is to tell the exact moment to add the oil to the melted gum, and experience alone can tell. If the gum is melted too long, it becomes dark in color; if underheated, it will be paler, but will lack durability.

After adding the oil, the gum and oil are heated together until the two are thoroughly combined, when the kettle is withdrawn from the fire. The kettle is next taken into the thinning-room where the mixture is allowed to cool to a certain temperature, and the thinner or solvent added.

After thinning, the varnish is pumped through a pipe to a vat or cooler where, besides cooling, it settles and becomes clearer. From the cooler the varnish is passed through a filter press which removes all the dirt and foreign matter. The varnish is next pumped to the ageing tanks where it is allowed to thoroughly ripen. This ageing makes the varnish bright and clear.

Laboratory tests are made of the varnish during the various stages of manufacture, as well as of the finished product. The finished varnish is also subject to the tests of an expert wood finisher for practical qualities, such as flowing, working, setting, drying, rubbing and polishing.

Theory and Practice for the Foreman Finisher

JUST what amount of theory should enter into the work and training of the foreman finisher is a subject around which there might be woven considerable discussion. How often one hears a man criticised as being well up in theory but not competent in the practical end. And there would appear to be ample justification for such judgment. The fact remains, however, that a thing cannot be both good in theory and bad in practice; for, after all, theory governs practice to the breadth of a hair, and it is only defective theory that is productive of defective practice.

These reflections are induced by a communication received from a correspondent of this journal who criticises some of the observations made by Mr. A. Ashmun Kelley in an article, "Talks with the Varnisher in the Finishing Room," reproduced in our October issue. In giving the following extracts from our correspondent's letter we commend the character of the criticism, which is constructive, but we are not altogether at heart with the reflections upon the theoretical side.

"How many foreman finishers do you imagine ever heard of Kissling, Livache, Chevreul and Cloez? How many finishers understand what is meant by 'pyrophoric state,' 'resinification of oils,' 'non-siccative oils?'

"In my opinion, your article is written by a man well up in theory. He has certainly put plenty of it in the article. Pointing out the dangers of spontaneous combustion and what precautions may be taken to avoid it, is good for the finisher, but we doubt if he is interested in the theory.

"Under the heading, 'Light in the Varnishing Room,' conclusions 2, 3, 4 and 5 are good for the finisher to know. The others are too theoretical for the average man to understand.

"The section on 'Sudden Cracking of Varnish,' is certainly not clear. In furniture work, particularly, the operation is generally stained, filled, shellaced, and then rubbing varnish. What dries more quickly than shellac, and it does make a good foundation on furniture.

"Mr. Kelley's views on the Ageing of Varnishes would certainly mislead a finisher in a furniture factory. The statements are true, but they apply to what is known as Long Oil or Coach Varnishes. Such varnishes, when standing for several months, undergo a chemical change and throw off a sediment. When this throwing-off process is complete (taking anywhere from six months to a year, depending upon the particular varnish) that varnish is then filtered and ready for use. In practically all varnishes for furniture work, this action does not take place. By far the larger bulk of furniture varnishes are made today, filtered tomorrow and shipped the third day. They may stand for a year or more but the above action does not take place in them.

"In reading over your paper, I am particularly impressed by the article, 'Effect of Sanding on the Finish' (October issue). This article is good all through. It is one which the furniture manufacturer would do well to impress upon everyone in his factory, from the General Superintendent down."

In the conclusions of the article, "Light in the Varnishing Room," to which our correspondent refers, Mr. Kelley quotes expert opinion to show that light assists materially in the process of drying, in the case of both oils and varnishes. The conclusions to which our correspondent refers are the following:

2. Raising the temperature exercises a very great influence upon the rapidity of the oxidation.

3. The intensity of the light has also a very manifest action upon the progress of the oxidation.

4. Light transmitted by colored glasses retards, more or less, the resinification of the oils by the action of the oxygen of the air. Starting from colorless glass as a point of comparison, the retardation of the oxidation is in the following order: Colorless glass, blue, red, green and yellow.

5. In the dark the oxidation is considerably retarded. In the first place, it does not begin for quite a while; and, when begun, proceeds much less rapidly than under the influence of light.

Problems of the Finishing Room

SOME interesting observations published under the above heading are contributed to our contemporary, The Furniture Manufacturer and Artisan, by Walter K. Schmidt, analytical chemist. From the queries received and answered by Mr. Schmidt we select the following as being of special interest.

Finishing Basswood

We use large quantities of white basswood which we finish with one coat of oil, one coat of shellac and two coats of spar varnish. Owing to the scarcity of basswood we find it almost impossible to get a large enough quantity of pure white basswood. In nearly all the basswood there is more or less basswood of a yellow nature, which after it is oiled does not look well when placed along side of the white boards. We have lately taken to oiling the boards before they are put together so we can pick them according to color. We have no objection whatever to having the boards all yellow so long as we can get them an even color for varnishing.

We are writing to see if you can inform us where we can procure a suitable stain or wash which we can apply to the surface of the basswood before we oil it. After this dries we can then apply the oil and shellac. The color would have to be, of course, a very light yellow just of the white and would be of such a nature that it would dye the white all one color; that is to say, it would not do to have the dark spots of the white become darker after the application of dye or wash.

Peterborough, Ont. Peterborough Canoe Company

Answer by Walter K. Schmidt.—The proposition that you have of getting uniform color on basswood can only be overcome by staining the material. This can be done best by using naphthaline yellow, auramine together with mordant of bichromate of potash. This, I should think, could be handled very much like the stepladder proposition, by dipping the wood into

tanks. After the formula is once established and the wood cut to size, this can be done before the wood is kiln dried, as the color penetrates sufficiently to permit of dressing afterwards. The drying of the wood after staining seems to ripen it and thus gives it a richer and a more uniform color. Altogether it would seem a more preferable shade than the white basswood, which is more or less lacking in character.

Circassian Walnut Finish for Gum

Some of our large eastern consumers are using the Suleo brand of red gum and have had no difficulty other than to get a formula for finishing the gum as Circassian walnut. This finish is seemingly difficult to obtain on red gum and particularly in regard to the proper dark shade. In this case, when the depth of color is obtained, it hides the grain of the wood.

A great many furniture manufacturers in this section are able to accomplish the proper results, but are extremely reticent as regards giving out information as to how this is accomplished. Any information on this subject will be greatly appreciated by

New York. Sumner Lumber Company,

Answer by Walter K. Schmidt.—To make Circassian walnut out of gum wood, especially when you use the red gum, the gum wood must be stained with a brown water stain, very thin. Where the gum runs on a pinkish shade, a very thin coat of nigrosine aniline dissolved in water will do the trick. Then sand and shellac. Both of these stains are transparent and the color is brought out only when the shellac is put on. Some have tried to bring out the grain by employing a thin oil coat on top of the stain. For your brown, use what is known in the market as "walnut brown crystals" and make the solution by using boiling hot water. While we cannot give you the quantity, this, however, is a simple matter of trying out the various strengths of stain.

Suggestions for Fuming Oak

IN large cabinet shops oak goods are rarely coated with stain as they generally have at hand a room or large box, commonly called a stove, which can be sealed up perfectly airtight, in which oak goods can be so arranged as to permit the fumes arising from liquid ammonia to play freely around them. This, acting on the tannic acid of the wood, causes it to assume a darker or aged appearance without wetting the surface.

The ammonia (specific gravity 880 degrees) is distributed about the floor in several shallow earthenware dishes, glass panels in the doors being provided for observation purposes; half a pint of ammonia is generally sufficient for a stove 9 feet long, 6 feet high, 3 feet 6 inches wide.

The goods being perfectly clean, free from oil, varnish, or polish, and having all mirrors and brass fittings removed, are subjected to the action of the fumes for periods varying from twelve to thirty-six hours, according to the color desired.

This is an ideal plan, as it does not raise the grain, but it requires a very careful selection of the woods, as some kinds of oak darken much more readily than others. When this is found to be the case the action of darkening on those parts already dark enough must be arrested by coating them with paraffin wax or beeswax dissolved in turps, then submitting the articles to the fumes for a longer period.

Readers who may care to adopt this plan should be very careful when first opening the doors not to inhale the full force of the ascaping fumes.

Those who have no such convenience at hand for fuming must perforce fall back on staining, but as fumed work varies very much in its color to suit individual tastes there is no one stain that will suit all requirements. The bichromate of potash solution given under "Mahogany" acts equally as well on oak, while the addition of, say, quarter-pint ammonia to each one pint of potash solution proves an effective stain for some purposes, though it is not strongly recommended on bold figured oak if the strong markings are desired to be retained. It is also possible to gain the desired effect by the use of aniline dyes.

Practical Tests for Varnishes

Although no absolutely reliable tests can be applied to varnishes to determine their durability, yet there are certain points about them which will assist materially in that direction.

The first is color, and it is always useful to have some very small bottles at hand—those specially made for the purpose are best, and cost very little—so as to pour into them a little of the varnishes under examination, again having a standard in the several grades.

The depth of color will not tell much, because that will depend upon the grade, and although it would be a serious defect in a varnish to be applied to white work, it would not be of much moment in some other cases. But there should always be an absence of turbidity or muddiness. If the varnish is more or less dark it should yet be clear.

There are two practical tests which may be easily applied, and both of them will give an indication of the presence of rosin, which, I venture to assert, is always an objectionable ingredient in varnish, excepting in very small quantities. It is, however, added principally for the purpose of cheapness and partly to lower the degree of heat necessary in melting the gum resins which are the chief ingredient of most varnishes.

Place a sponge saturated with water on the surface of a coat of varnish and leave it on over night. If there is much rosin present the varnish will be found to be white, and probably more or less wrinkled. If the varnish is a good one, however, there will either be no white mark at all, or if there is one it will regain its color when dry.

A pad made of several thicknesses of felt saturated with water is better than the sponge, as it will touch a larger surface, and a light weight may be placed upon it to hold it in contact with the surface.

The second test which I recommend is to scrape the dry surface of a coat of varnish with a sharp penknife. If the varnish is of high-grade quality the ribbon scraped off will be tough and sharp at its edges; if much rosin is present the edges of the scraped portion will be ragged and the film show distinct signs of being brittle. This test is a good one also for linseed oil.

The question of hardness of varnish is so important that Dr. A. P. Laurie sometime since patented an instrument the principle of which was simply that of scratching a dried and varnished surface by means of a steel point.

The apparatus enables accurate readings to be taken, and it has been found that a fine carriage varnish will withstand a pressure equal to 1,200 grains, fairly good common varnishes 700, rosin varnishes 200

to 400, and spirit varnishes only a pressure of 100 grains.

Then we see why it is that the latter are bruised with even a light blow, while the best carriage varnishes will withstand a considerable force.

The smell of varnish gives some information as to its quality, while the time taken to harden the degree of flowing and working under the brush all yield useful information.

It may be added that it is the opinion of Dr. A. P. Laurie, based upon the experiments he has conducted with his instrument, that the best oil varnishes do not attain their maximum hardness until twelve months after they have been applied.

The question of brilliancy of gloss I have not entered into, as this will be sufficiently obvious in comparing several grades of varnish. It will be best to conduct these experiments in a well-ventilated room heated to a temperature of about 60 degrees. A very hot room containing moisture-charged air is not suitable.

In conclusion I should like to remark that there are many more simple tests which could be made, but they mostly involve the use of heat, or some appliances which are not at hand.

A writer in one of the English papers says that a good stain for fir is made by using one-third oil, one-third benzine and one-third benzol with enough driers and the proper amount of oil colors to get the shade wanted. The stain will penetrate the wood so well that it has the appearance of a water stain with the advantage that no sandpapering is needed. Give the stain one coat of shellac and one coat of varnish, full body, and the result will be a job as good as most work receiving two coats of varnish.

The Interpretation of Finish

THERE seems to be room for some interesting discussion on the subject of what is the correct interpretation of the term finish, as applied to the materials and the process of finishing off cabinet work. Is the purpose of the finish merely to dress up, finish off and improve the appearance of the wood, or does a broader, fuller interpretation of the word mean that it should at the same time serve as a preservative? The point of difference in the interpretation comes in sometimes in the course of contention between the glue room and the finishing room about which is at fault when the finish shows up badly. One side argues that the finish ought to fill up pores and fine cracks in the wood and help preserve it, as well as make it present a good appearance. Others contend that the only purpose of a finishing material is to finish off a surface.

It is very likely that the finisher who takes the attitude that it is not the purpose of the finish to help preserve the wood will have more trouble and failures than the man who follows the idea that it is the duty of the finish to help fill up and protect the face of the wood. The arguments that it is possible to put up in connection with this subject illustrate the different angles from which the woodworking department and the finishing room view the matter. Perhaps the right idea for the proprietor is to view the matter from both angles and then see if he cannot find a common angle from which all view the matter, and thus get more harmony and satisfaction out of the work.—Veneers.

Veneers and Panels

Practical Points in Selecting Face Veneer

By T. Morgan

THERE are many problems in connection with the proper selection of face veneer. Some of these are physical problems that have to do with the practical application of veneering, using it in making up the work, while others are matters of relative values in the appearance of the finished product.

Here is one, for example, that some one springs every once in a while. Why is it that oak either sliced or rotary-cut has a right and a wrong side and may not be used with the wrong side up, when mahogany and Circassian walnut are often reversed in the process of matching up into figures? Why is it that a man wanting to reverse and match up quartered oak is told that he must have sawed stock instead of cut stock, while in matching up mahogany and walnut he may do it from cut stock without question?

Hardness of Oak Structure

The main answer to this is that the quartered oak has a series of peculiar hard films running through it which make the splash line figure. These are so hard that no cutting knife will split them continuously. The knife either digs above or below them in the process of cutting. The result is that the grain is slightly ruptured and uneven and in the final drying out this hard film making the splash line will show flakes somewhat like raised grain.

Now and then some man with a new equipment makes the claim that he can cut quartered oak as well as it can be sawed, and we are undoubtedly making improvements and doing better work in slicing oak than ever before, but no man has ever yet produced sliced oak which was as firm as sawed oak or that could be reversed in matching up figures and give the same satisfaction. Some day we may come to this as the oak gets scarce and more valuable. This will have one influence, and another will be that we will probably learn that by using it in very thin sheets to glue this sliced veneer down so thoroughly that it will not flake up after finishing no matter if the grain has been disturbed a little in cutting.

Another reason that practice is not followed in connection with mahogany and walnut is that these woods have not that hard film of quartered oak and they cut better. There is some disturbance of the fibers in cutting, but it seems to be more evenly distributed and to be easier held in place with glue; therefore it is easier to cut these woods and handle them with both the right and the wrong side out in matching up and get satisfactory results than it is with oak.

A reason entering here is that of the comparative high price of the finely figured wood. There is some sawed mahogany even in fairly figured stock, and some sawed walnut. Also there is sawed figured gum as well as sliced. When it comes to the extra fine figured and valuable wood, though, in mahogany and walnut it is seldom sawed. The reason is that over half the finely figured product would go into sawdust with the very best of saws and finely figured wood is too valuable to permit this.

Expense of a Sawdust Pile

In discussing this subject recently, an experienced manufacturer who uses quite a range of figured woods said that there is little really fine mahogany sawed, and practically no finely figured Circassian walnut. "Take stock," he said, "selling from five to seven cents per square foot, and you can easily figure how any man could soon put a fortune into the sawing pile. Usually more goes into sawdust than the thickness of fine face veneer, but take it in round numbers and for every thousand feet, surface measure, of veneer produced there would be from $60 to $70 going into sawdust. In other words, the sawdust pile would equal in value the veneer pile, and there is no man going to waste valuable figured wood in any such way."

We are, therefore, confronted by this anomaly in the matter of fine face veneer—the sawing being admittedly the best process for working veneer, and yet the very finest and most valuable face veneer is practically always cut stock.

In the selection of face veneer the widest range of values is found in mahogany, and it is here that it takes experience to teach a man values. Without experience it is pretty hard for a man selecting face veneer to know whether or not he is getting his money's worth or getting a bargain for his money. In the furniture trade the usual range of mahogany face veneer values is from about two cents a foot up to five cents, with more of it running to two, three and four cents. Then there is other face veneer in mahogany running from five cents on up to 12½ cents per square foot. Just to complicate the matter, too, there is sometimes found figure in short lengths of mahogany that will sell for five or six cents which if it were in longer lengths and broader sheets the seller would want from 10 to 12½ cents for it.

Beginning with plain mahogany, which has a fairly uniform and stable value the country over, there are various figures that are found with enough frequency to be practically standardized, which also have a fairly well fixed value. Aside from these, though, the selection of mahogany and establishing of values is one that calls for experience and a natural talent for judging figures and their possible appearing qualities to the public after being finished.

Piano people usually get the bulk of the finely figured, expensive mahogany, but others are bidding for this much more than they used to. Planing mills making fine woodwork in which is involved the use of figured panels go after some of this fancy stock and the furniture manufacturers are giving more attention to it too. The indications are that we are entering an era of discrimination in regard to mahogany in which knack and knowledge of values in selecting face veneer will be a great factor in making profits for the manufacturer who puts up the work.

Circassian walnut is a wood that often ranges much higher in price than mahogany, and yet there is wal-

nut that is really not worth nearly as much as some of the mahogany. The government statistics on imported cabinet woods gives as the average value of mahogany logs imported last year $71.73 per thousand, while the average values given for walnut is $120.64. That is a little less than double value for the walnut which is mainly figured wood, whereas lots of the mahogany is plain.

This Circassian comes in the form of short, ragged logs that in the process of working up and trimming to size to match up into fantastic figures involves lots of waste, so that when the finished face veneer is produced the average value of the figured Circassian is often three or four times the average value of mahogany. That is one thing that makes the seemingly wide range of difference between buying Circassian veneer straight as it comes from the log and buying faces or panels trimmed and matched up into specific dimensions.

There are some manufacturers of veneer who make it a part of their business to trim, tape and match up veneer for specified size panels and other face work. Naturally, when they add to the original price of the veneer the cost of doing this work and then the waste involved it makes these look like high in price. It is often cheaper, though, for the user of a limited quantity of this kind of stock to pay the price and buy just what he needs matched up.

Getting back again to the matter of cut and sawed stock, we have touched so far mainly what is called sliced stock as compared with sawed stock. There are three methods in general use for producing face veneer —sawing, slicing, and rotary-cutting or peeling the sheets from the logs as they revolve in the veneer lathe. The great bulk of the rotary-cut stock is used for backs, fillers, drawer bottoms and plain panels, and in the package trade. It does enter, though, into the face veneer business, and quite extensively, too.

Indeed, there are certain woods that are best manufactured into veneer by the rotary process. Bird's-eye maple is a notable example of this. Yellow pine is another wood which presents its best figure in rotary-cutting. Oak also presents beautiful figure from certain blocks in rotary-cutting and sometimes it is easy to make a better job of the cutting of plain oak on the rotary than with quartered oak on the slices.

The rotary machine doesn't have to split the splash line film; it cuts across it and gets its figure by the irregular crossing of the line of cut of the annual rings of growth. These cause hard and soft spots in the wood, but with a good rotary machine and with the stock properly prepared one can produce an excellent article.

Gum and birch are among the woods quite extensively used for rotary face stock perhaps with more birch than anything else in the north and more gum used in this way than any other wood in the south. Gum has an excellent texture for cutting; it cuts smooth and takes a splendid finish, though it is not always so easy to hold with glue as some other woods. We are just getting to the period where gum is being properly appreciated for face work and in the future is likely to be valued much more than it has been in the past.

Quite a lot of mahogany is cut on the rotary machine, especially what is called plain mahogany, and there is walnut, some of it cut on the rotary straight and some of it sliced with the rotary by using a stay log. Taking it all together there is quite a nice percentage of the best of our native woods used in the form of rotary-cut veneer for faces and we are likely to see much more of it in the future.

It behoves the buyer of face stock to make a study of these to understand their relative values as well as their relative cost. And in keeping all the different methods of cutting in mind he should make it a point to stop and analyze matters now and then that he may not become confused over the relative values of different products because these are not always based on the method of cutting.—Wood Craft.

Construction of Veneered Windows

By Chas. Cloukey

FOR the most part, windows are made of solid pine, oak or cypress lumber for outside work, but occasionally there comes a specification calling for all windows to be veneered to match wood finish of rooms, and then it is up to the mill man to get them out in the best manner possible, both as to looks and durability. Sometimes the architect will furnish the details to work by, but more often he side-steps this as a delicate question and leaves it to the factory detailer to submit his ideas of this class of veneered work.

In Fig. 1 is shown a style of veneering suitable for the best class of veneered work, and the only serious objection that might be found with it is the fact that the inside molding is put on as a stop instead of a solid sticking. On the other hand, it saves the work of edging the stock and gives opportunity for using up short, narrow waste. The checks shown in Fig. 1 are made of solid wood of the same kind as the veneers, and it will be found cheaper to make them in this manner than to veneer them, unless the wood is very expensive or in case it may be had only in veneers.

Great care should be exercised in handling work of this kind, to put it up in such shape that when it is done the various members will be straight. There is so much know-how about this operation that many men of experience will tell you at once that it is impossible to get a good practical job out of veneering one side only of windows, doors or anything else. However, many good jobs of this same kind of work have been put up in the past, and it is good sense to say that they may be repeated at any time.

In the first place, it is necessary for us to get both pieces of the same dryness, and to do this it is necessary to put them in the kiln and leave them there until we can demonstrate that they are dryer than the outer air in which they will be worked. When we know that both core and veneer are dry, they should be stacked up in the shop for at least ten days, in open sticking, so as to bring them both back to the natural humidity. The idea in taking all of this precaution is to keep the pieces from warping as they assume their permanent relations. If the veneer is dryer than the core, then the core will shrink more in the end and show a concaved side; and so, if the veneer is damp and the core dry, the veneer will be on the concaved side.

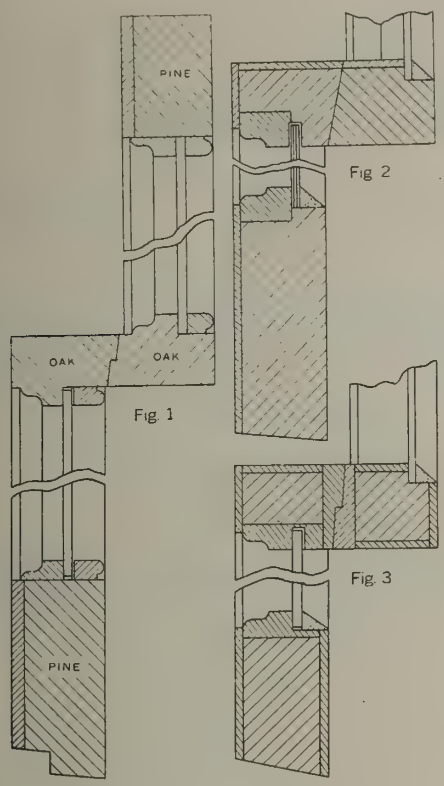
"But," some one will say, "we have tried all that so far, and find that the pine core and the oak veneer will swell up on the veneered side from the glue moisture, and there you are with bent stiles and rails as bad as ever."

Now, we have another card up our sleeve, and we are going to lay it on the table right here. The moisture last alluded to is of a temporary character and its influence may be overcome by management and main strength. In other words, the stock coming from the press should be cross-piled with care and weighted

down until the pieces show straight. The best way to do this usually is to make the piles from the floor up directly under a beam or girder, so that a stout post may be set upon the pile and set tight with a jack-screw.

If this stock has been properly handled before gluing, and is left in the pile under pressure until it is as dry as the atmosphere in which it will be worked, there will be no more trouble with it than there is with solid stock. We must remember that in times of great humidity of the air the pine side of veneered stock will absorb more moisture than the oak or hardwood side, but not more than it would if veneered with pine on the outside.

Fig. 2 shows a window veneered on one side and with the edge strip rabbeted in instead of attached as a stop. This will permit of using a very much thinner



Details for veneering windows

veneer than is required to cover the pine in the first figure, and makes a very good job. The checks in Fig. 2 are veneered on those parts exposed to the inside of the building, and will require the same care in handling as other material to be veneered on one side.

Fig. 3 shows a style of veneering intended to meet the demand for a full veneering, and it will be seen that the edge strips have to be thick enough to give ample covering at the ogee sticking and to make the putty rabbet. For windows having an outside veneer it is almost imperative that putty be used to seal the glass in, on account of protecting the glue joint of the veneer.

Here, again, we can see the expensive proposition of veneering the checks. The lower checks will have one thick edge strip to accommodate the sticking, while the upper check may have two thin edges to start with, if carefully worked to near size before veneering. The veneers are applied to the sides as usual, with the difference that the parts intended for the meeting rails will have to be thick enough to make the bevels and to allow for the sticking, usually not less than ⅝-inch.

Interior sash are usually edged on one edge and veneered both sides, while in some cases outside side lights are made with solid stiles where they are narrow and with veneered rails where the rails are wide. The most important piece of advice I can think of in conclusion is not to take a job of veneered windows to be delivered in a hurry.—Veneers.

Circassian Burls from Southern Russia

THE burls of the circassian walnut tree for veneers for the cabinet-maker's use have for a long time been an important article of export from the region bordering the Black and Caspian seas in Southern Russia. Originally all these burls were shipped to France and were called "loupes." Trebizonde in Turkey was formely the center of this industry. After these burls reached France they were reshipped to England, Germany and the United States. The French dealers always found it a very troublesome trade and were obliged to go to Turkey every year and proceed into the interior in order to judge for themselves of the character of the burls, which vary very greatly in price, according to age and quality.

These burls are now becoming very scarce and they are generally purchased from the peasants at much higher prices than formerly. By the time they are transported to the seashore and shipped to different ports in Europe they are often sold for fabulous prices. It would seem, however, that these French dealers realized very large profits, a fact which induced a number of timber merchants in England and the United States to undertake, on their own account, similar operations in Turkey with a view to saving the exorbitant profits of the French merchants as well as the expense of handling the logs and burls at the French ports. Practically all large dealers in Liverpool and London and a few American concerns get this valuable material directly from the place where it grows. As these burls, or ornamental knots, are now becoming scarce and are used in large quantities in the United States, it might be worth while for American dealers to follow the example of English mahogany dealers in seeking a good substitute elsewhere. The Mexican and South American walnut has been suggested and while it is a shade darker in color, it is an admirable wood and deserves attention.

BEFORE the invention of the modern taping machines it undoubtedly cost so much to match up and tape narrow veneer that it was cheaper and better for the veneer user to buy wide stock, even though it cost him more, comments Veneers. This fact has been driven home so deeply that it is probable that some veneer users are retaining too strong an impression of it even today. Things are changing rapidly in the veneer-using world. As compared to a decade ago, there are wonderful facilities for jointing and taping veneer to make wide pieces out of narrow ones, and the cost has been reduced so much, as compared to the time when this was done by hand, that there is hardly any comparison. Veneer users should find it possible to use much more narrow stock now than formerly, and to use it at such a reduced cost for jointing and taping that it should in many instances prove a profitable proposition.

OAK MAHOGANY CIRCASSIAN MAPLE

VENEERS

BIRCH POPLAR CHERRY WALNUT GUM

SLICED AND SAWED VENEERS

QUARTERED OAK AND MAHOGANY

We buy the best of Indiana White Oak Timber and make the best grade of quartered oak Veneers put on the market.

Write Us for Prices

Central Veneer Company

Winter Ave. and Belt R.R. H. J. BARNARD, Manager **Indianapolis, Indiana**

High Grade

VENEERS

all thicknesses

We are the pioneers in the business.

Strong Veneer Co.

Jamestown, N. Y.

Goshen Veneer Co.

GOSHEN, INDIANA

Does Experience Count?

¶ We have been making veneers of quality for over fifteen years.

¶ We are sure that our stock, our method of doing business and our prices will more than please you.

Write us to-day for

Poplar and Red Gum Veneers and Crossbanding

H. C. HOSSAFOUS

MANUFACTURER OF

Sliced Quartered White Oak Veneer

Genuine Indiana and Ohio white oak logs, cut into flitches at our own plant, **perfectly smooth cut and dried flat** and without gloss.

We can help you solve your Sliced Oak Problems
Let us quote you on your Reuqirements

DAYTON, OHIO

Combination Hand Feed and Power Feed Rip Saw

Readers of The Canadian Woodworker will find many points worthy of investigation in the Hoosier Combination Rip Saw made by The Sinker-Davis Company, of Indianapolis, Ind. The "Hoosier" is the only combination power feed and hand feed rip saw made in the world. One of the strongest arguments is that in the combination Hoosier machine the user gets two machines, but for the price of one.

The main frame of the "Hoosier" rip saw is cast in one piece and is heavily ribbed to insure perfect rigidity, an essential quality in a machine of this kind. This one-piece frame carries the mandrel and lower feed works. The table top also is cast in one piece and re-enforced with ribs on the under side and accurately planed on the upper side. This table top is raised and lowered with right and left-hand machine-cut worms and worm wheels and these are operated by

Hoosier combination rip saw made by the Sinker-Davis Company.

a crank at the front end of the machine handy to the operator. This construction does away with all clamps, bolts and screws and this method of vertical adjustment automatically locks at any point. The saw mandrel is made of high-grade machine steel, is 1¾ inches in diameter and runs in four boxes; one at each end of the mandrel and two in the center; these boxes are lined with the best anti-friction Babbit metal. The bracket box that carries the outer end of the mandrel can be quickly and easily removed, which permits changing of the saws easily.

The feed works are heavy enough to handle stock 6 inches in thickness and are self-adjusting to the varying thickness of the stock to be ripped. The feed works are counterbalanced by a heavy weight and therefore easily raised or lowered. Four feeds are provided from 35 to 150 feet per minute with a mandrel speed of 3,000. A clutch enables the operator to stop the feed works while the machine is in motion; the board gauge, which is made entirely of iron, works in a "V" groove planed in the table top and is quickly and easily adjusted to the scale on the front of the machine directly in front of the operator; the collar stock space on the mandrel of the No. 1 machine is 8½ inches long and will rip stock 17 inches wide; and on the No. 4 machine 14 inches long and will rip 23 inches wide. The "Hoosier" machine will carry as large as a 20-inch saw. It is provided with in and out feeds that are made with spurs, corrugated rolls, smooth iron rolls or rubber rolls according to the work to be done.

By making the upper feed works hinged as shown in the illustration they can be raised up out of the way by means of a counterbalance weight and leave the machine clear for hand feed ripping. This change from power feed to hand feed or the reverse can be made easily and quickly.

The Sinker-Davis Company also makes several other styles of rip saws, including the "Hoosier" cleat machine for short gang ripping, No. 2 and No. 5 machines with one stationary and one movable saw and the No. 6 for ripping wide veneers.

Since the Sinker-Davis Company, of Indianapolis, Ind., started to manufacture the "Hoosier" machine the concern has built over 1,600, which certainly should be considered a sufficient indorsement of the design and construction of the different styles of the "Hoosier" self-feed rip saw.

Three Essentials in the Finishing Room

It is in the finishing room that manufacturing reputations are made and lost, and the importance of employing only the best finishing material cannot be emphasized too strongly. We are led to a consideration of this subject by an investigation of the products of the Advance Paint Company, Indianapolis, Ind., who claim that in their Maple-Lac, their new Fuming Process and their Water-Proof Shellacs they have three great essentials for the finishing room. An investigation of these claims will not be overlooked by the progressive woodworker.

Maple-Lac preserves the natural whiteness of the wood and gives that perfect finish which may be regarded as the chief requirement in white maple goods. There is no yellowing with age as in the case of shellac or other coaters.

In the company's new fuming process, the genuine fuming effect is produced without resource to the fuming chamber. It is recommended on the grounds of economy and efficiency and the fact that it is "fool-proof." The process of fuming is made as simple as finishing golden oak. It is applied in the same way as an ordinary filler, care being taken that the work is thoroughly covered with this pigment stain. After standing two hours or more, until thoroughly dry, the pigment is rubbed off with excelsior or sea moss. The pigment comes off very easily as it contains no binder. After the work is cleaned it is sanded lightly and then shellaced and waxed in the usual manner. It is in this way that the genuine fumed effect is produced. As a final proof of the merits of their fuming process, which is in successful use in hundreds of large factories, the company are prepared to furnish the trade with a sample of the material and the few simple, necessary instructions.

The problem of making shellac water-proof has been solved by the company in the product which they recommend as the "third essential." A Water-Proof Shellac—made in white, orange and brown—has been produced without changing the nature of the shellac or the methods of working, drying and sanding. A careful test was made recently with a view to ascertaining the comparative efficiency of this water-proof shellac and the ordinary shellac. Two coats of the company's product were applied to panels which were submerged in water for twenty-four hours, at the end of which

time they were taken out in perfect condition. Panels treated similarly with the ordinary shellac turned a milky white and the shellac was destroyed. This would appear to clinch the company's argument that their product affords absolute protection against moisture. Water-proof shellac prevents mahogany furniture from taking up moisture and turning grey and is an ideal coat for mission finishes.

These "three essentials" are worthy of investigation, for a personal knowledge of such products as we have enumerated above should be a part of the progressive manufacturer's stock-in-trade. Readers of the Canadian Woodworker should write to the company for trial samples.

The Moore Universal Rubbing Machine

The possibilities of the Moore Universal Rubbing Machine are well illustrated for the practical man in the accompanying cut. One of the features of this machine is a patent flexible guide bar, the action of which ensures a uniform finish throughout. Any required pressure is obtained by means of an automatic pressure device attached to the machine. An automatic arrangement for governing the pressure of the heads is also provided, this being a great advantage upon round or oval table tops. The work-table is mounted so that it can be lowered to the base of the machine, when it will accommodate case work 34 in. high. The machine is also made to accommodate cases up to 39 ins. high. The standard machines are made for stock 6 ft. and 8 ft. long by 34 in. high. Each machine is fitted with two travelling heads and an extra pair of felt plates. The floor space required for the 6 ft. machine is 10 ft. by 10 ft. and for the 8 ft. machine, 10 ft. by 12 ft.

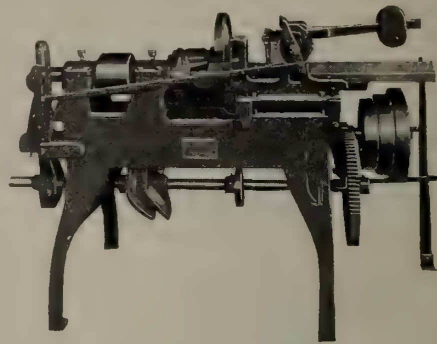
The Curtis Machine Corporation, Jamestown, N.Y., guarantee the above claims and offer to place one of these machines in any plant upon approval.

The Curtis Machine Corporation have purchased the interests of the Moore Carving Machine Company of Minneapolis, Minn., the Jansen-Peterson Company of Cleveland, Ohio, and the Lucas Machine Company of Jamestown, N.Y. They are now building a new plant in Jamestown where they will carry on the manufacture of the complete lines of these three concerns.

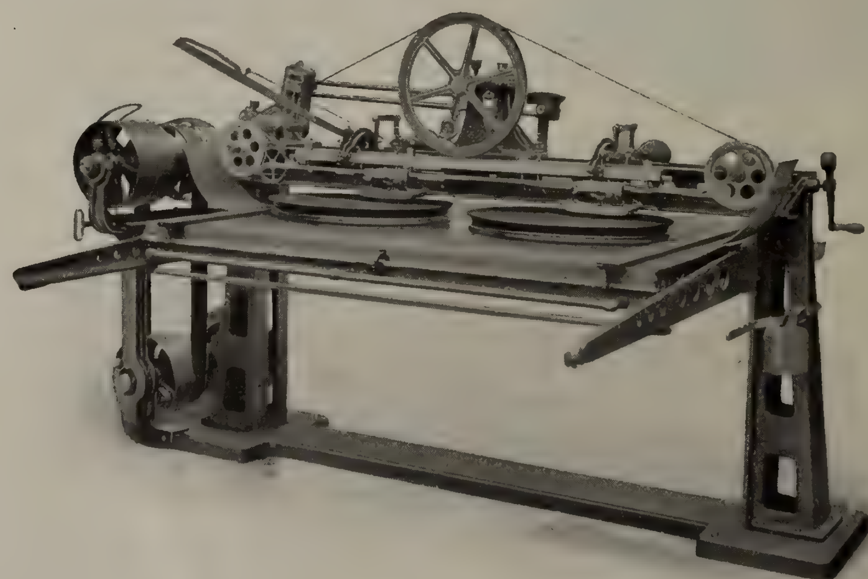
We regret to record the death of Mr. A. E. Hourd, of London, Ont., which occurred in that city on the 2nd instant. Mr. Hourd was the proprietor of Hourd & Company's furniture and novelty factory in East London. His death occurred after a very long illness, but he had been able to attend to his business practically to the end.

An Efficient Departure in an Automatic Plug Machine

Carver's Automatic Plug Machine, illustrated herewith, is a radical departure in machinery of this type and offers a noteworthy improvement in the methods of manufacture now in use. It is capable of turning out 18,000 to 20,000 plugs in ten hours with one operator, as compared with 5,000 to 7,000 with other machines. The company point out that the saving effected, at a minimum of $2.00 a day, soon pays for the machine, leaving a wider margin of profit in the timber saved and the efficiency of the work. The manufacturers guarantee this machine to be the best on the market for making plugs to go in rolls of paper, bungs, such as are used in roofing paper, and screen wire rolls. Working at the capacity given above, the machine turns out plugs 2¾ in. in diameter and 1¾ in. long, and other sizes proportionately. In this machine, stock of any length can be used—from one foot up to twenty or more—and the ends do not have to be squared or pointed, nor does the stock have to be equalized. The feed being continuous, all that is necessary is to feed the stock from end to end. The floor space occupied by the machine is 2 ft. 6 in. by 6 ft. 6 in. Its weight, crated ready for shipment, is about 2,100 lbs. The manufacturers are the Eagle Machine Works, Indianapolis, Ind.



Carver's Automatic Plug Machine.



Moore Universal Rubbing Machine.

Trade Happenings and Opportunities

Woodworking News from Coast to Coast

The St. Malo Furniture Company, of St. Malo, Que., have obtained a charter.

The Beverley Wood Specialty Company, 91 Niagara Street, Toronto, contemplate increasing their plant.

The Pointe Claire Sash & Door Company, Limited, has been organized. They will build at Pointe Claire, Quebec.

The St. Martin Lumber Manufacturing Company, Limited, who were incorporated recently, will make their headquarters at St. Martin, Que.

The Kelsey Steel Company, of Detroit, Mich., and Windsor, Ont., intend improving their plant at the latter place to the extent of some $50,000.

The Thurso Manufacturing Company, Limited, has been organized with a capital stock of $49,000. The firm will erect a furniture factory at St. Thurso, Que.

Scholey Bros., who have a planing mill at 191 Ontario Street, Toronto, recently suffered a fire loss to the extent of some $7,000. The plant was insured.

Excavating has been started for the new box factory of Daniel Senecal, Wyoming, Ont. The factory will be one storey, 120 x 30 ft., of brick construction.

R. T. Smith & Company, Hillsdale Avenue, Westmount, P.Q., suffered loss by fire at their sash and door factory recently. The damage amounted to about $25,000.

The Western Casket Company, Limited, has been organized at Winnipeg, Man., for the purpose of manufacturing undertakers' supplies. The capital stock is $50,000.

The B. C. Hardwood Floor Company, Limited, has recently been incorporated with a capital of $10,000. The firm will operate a planing mill in the city of Vancouver.

A large quantity of lumber belonging to Deschenaux Bros. sash and door manufacturers, Verdun, P.Q., has been destroyed by fire. The outbreak commenced in the yards.

A $70,000 addition is contemplated at the factory of the Petrolia Wagon Works, Petrolia, Ont. The new addition will be of white brick construction. Machinery will be required.

The planing mills of the Greater Ottawa Lumber Company, Ottawa, Ont., were destroyed by fire last month, the loss amounting to some $70,000. It is not yet known definitely whether the firm will rebuild.

L. P. Rogers' sash and door factory at Pont Viau, Que., was visited by fire recently, damage being done to the extent of some $6,000. The loss was covered by insurance. The owners will re-build.

The planing mill of the Ross-Saskatoon Lumber Company, Limited, Waldo, which was shut down for a time owing to the slow demand from the prairies, was started up again in September, orders having started to come in more freely.

W. Johnson, sash and door manufacturer, 854 Sixth Avenue west, Vancouver (formerly Martin & Johnson), has added a 15 x 6 Canadian Machinery Corporation matcher and feed rip-saw to his equipment. An enlargement of the plant is projected.

Remington Arms Company have started excavating for their second factory building at Windsor, Ont. The new building will cost $50,000 and is one storey, 144 x 96 feet, brick and steel construction. Electric light and steam heating will be installed.

A project is under way for the establishing of a furniture factory in Saskatoon. Frank Giddings, who has had a long experience in this work is behind the proposition. Plans for the proposed buildings are in the course of preparation and it is understood some eastern capital is interested.

The Stratford Manufacturing Company, Limited, manufacturers of ladders, lawn swings, etc., Stratford, Ont., contemplate an extension to their factory. They have asked the city council for a fixed assessment for ten years and permission to close College street in order to double the size of their plant.

The Thurso Manufacturing Company has been incorporated by Quebec provincial letters patent with a capital of $49,000. The incorporators are J. E. A. Decelles, Mrs. Decelles, George Wilson, Irene Demers, and J. A. Hamelin, all of Montreal, and their object is to manufacture furniture and other wood products.

The furniture manufacturers of Canada are to exhibit their goods at Toronto in three of the buildings in Exhibition Park next January. Dealers will come from all over the country from the Atlantic to the Pacific to see the latest designs and place their orders. The Board of Control of Toronto have promised their fullest co-operation in making the exhibition a success.

The Scroggie Furniture Company, Limited, has been incorporated with a capital of $100,000, the head office being in Montreal. The principal object of the company is to carry on in all its branches the business of manufacturers and importers of and dealers in all kinds of furniture and furnishings, including doors, sashes, blinds, shingles, office fittings and all other articles of which wood forms a component part.

The box factory at Wilkins Siding, Queen's County, N.S., belonging to W. H. McElwain, of Boston, recently destroyed by fire, is being rebuilt on a much larger scale, and the owners expect that it will be ready to start up early in November. The entire supply of box stock, amounting to about six million feet a year is handled through this mill from boards furnished the company on a long time contract to the Sable Lumber Company, of which the W. H. McElwain Company are the managing owners. The Sable Lumber Company recently started up four of their sawmills and expect to run them continuously until June 1st, 1914. An extremely severe drought which prevailed throughout southwestern Nova Scotia recently, prevented the company from making an earlier start at these mills.

The Dominion Manufacturers Limited, the casket merger organized last May, has been showing steady development since the consolidation. In some districts the business has reached a total of 18 to 20 per cent. in excess of the business done by the companies a year ago. It is interesting to note that the increased business has been effected without any increase in the price of the company's product. The capital of the company is $550,000 six per cent. bonds; $1,000,000 seven per cent. preferred stock and $2,000,000 common stock. The aggregate earnings of the companies for the year preceding consolidation were equal to three and three-quarter per cent. on the amount of common stock now outstanding. The combined bad debts of the six companies in five years was $3,750. The company has factories at Toronto, Prescott, Hamilton, Que., Three Rivers, Que., London and Amherst, N.S.

Montreal Firm's Large Order for Shop Fixtures

Messrs. Jones Brothers & Company, Limited, of Toronto, have just executed a contract for the whole of the commercial furniture for the Scroggie Furniture Company's new store on St. Catherine and Bloor Streets, Montreal, which is expected to be opened for business very shortly. This job is one of the largest of its kind Messrs. Jones Bros. & Company have undertaken. The contract called for the completion and setting up of the whole order in four weeks. The order was received on September 7th, and the fixtures were shipped from the Dundas factory of Messrs. Jones Bros. on October 9th for erection on the site by their men from the Montreal factory. Although Messrs. Jones Brothers & Company worked under difficulties, owing to the other contractors being behind on their work, the staff of erectors were through and the job was completed on October 30th. The whole of the fixtures were varnished, rubbed and finished in the Dundas factory, whence they were despatched to the site quite ready for setting up. Messrs. Jones Brothers & Company make a special feature of completing, finishing and erecting their products before shipping them and this accounts for their being able to complete the job in such a short time. The contract consisted of counters, cabinets, clothing wardrobes, shelving for all departments, and show-cases, the whole outfit being finished in mahogany. The show-cases were constructed in an entirely new style—with copper bases, and of plate glass and cement construction, no frame work or clamps of any kind being used.

With metal furniture being used quite extensively in furniture factories, considerable interest attaches to a booklet, "Finishing Metal Products," received from Messrs. Moller & Schumann Company, Brooklyn, N.Y. This booklet tells of the various protective coatings that are employed to protect the material from corrosion and to give it a pleasing finish. The methods of finishing, the materials used and the quality of the finish are the subjects of interesting sections, while the "general directions," "hints on reduction," and other topics make up the complement. The various applications of the company's products are enumerated.

Morehead Tilting Steam Trap

The Canadian Morehead Manufacturing Company's catalogue, which has just reached our desk, contains much of interest regarding return, non-return, vacuum and condenser tilting steam traps.

The Morehead Automatic Return Trap is an appliance which receives the water of condensed steam from whatever source and delivers it into the boiler at practically the temperature due to the pressure at which the steam is condensed. It is applicable to any use where steam is used for power, heating, steaming, drying or other purposes. Its strong point is economy in fuel, and it has outstanding advantages over the pump which consumes an extravagant amount of steam doing very little work. There are no parts to get out of order in the Morehead Trap and the action is entirely automatic.

To meet the various conditions which obtain in steam and gas plants, the company have developed four sizes of traps, known as Morehead Return Steam Trap and Boiler Feed; Morehead Condenser Trap; Morehead Non-Return or Tank Trap, and the Morehead Vacuum Trap.

The catalogue contains a great many interesting views illustrative of the company's products and their application in service. Copies may be obtained from the Canadian Morehead Manufacturing Company, Limited, Woodstock, Ont.

Alphabetical Ltst of Advertisers

A correct census of the population of the principal cities of this continent—in fact of the whole world—taken in each decade of the past 50 years would tend to prove that Toronto's growth was probably the most phenomenal of all. In many parts of this Continent the mining and industrial centres have developed with great rapidity. The building of railways and harbours has propagated many a busy town site in a few years, but we must turn to Toronto for an example of what is probably the most remarkable percentage of increase for the past 50 years of any city in the world. At the present rate, Toronto, in ten years will have a population of 1,100,000 people.

It is a well-balanced foreman who doesn't look for perfection in his men or fret because it is not there; who sees in them just what is there and has the knack for getting the best out of them just as they are.

Have a talk with the machinery man before the end-of-the-year shut-down so that you can have the new machines and repairs ready on time and avoid delays.

BUYER'S DIRECTORY

AUTOMATIC DOVETAIL GLUE JOINTER
Canadian Linderman Machine Co., Ltd., Woodstock, Ont.

BABBITT METALS
Shurly Dietrich Co., Ltd., Galt, Ont.
Fay & Egan Co., Cincinnati, O.
Canada Metal Co., Ltd., Toronto.

BALL BEARINGS
Chapman Double Ball Bearing Co., Toronto.

BALUSTER LATHES
C. Mattison Machine Works, Beliot, Wis.
Thos. White & Sons, Paisley, Scotland.
Chicago Machinery Exchange, Chicago, Ill.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.
Canada Machinery Corp., Ltd., Galt, Ont.

BAND SAW FILING MACHINERY
Shurly Dietrich Co., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

BAND SAWS
Buss Machine Works, Holland, Mich.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Shurly Dietrich Co., Ltd., Galt, Ont.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
R. H. Smith Co., Ltd., St. Catharines, Ont.
Williams Machinery Co., Toronto.

BAND SAW MACHINERY
American Woodworking Machinery Company, Rochester, N.Y.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
Williams Machinery Co., A. R., Toronto.

BAND SAW MILLS
Berlin Machine Works, Ltd., Hamilton, Ont.
Fay & Egan Co., Cincinnati, Ohio.

BAND SAW STRETCHERS
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

BENDING MACHINES
American Woodworking Machinery Company, Rochester, N.Y.
Fay & Egan Co., Cincinnati, Ohio.

BELTING
J. A. Fay & Egan Co., Cincinnati, Ohio.
Sadler & Haworth, Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
H. W. Petrie, Ltd., Toronto.

BELTS (Endless)
Canada Machinery Agency, Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Sadler & Haworth, Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

BELT CEMENT
Sadler & Haworth, Montreal.

BLOWERS
Cyclone Blow Pipe Co., Chicago.
Ormsby, Limited, A. B., Toronto.
Sheldons Limited, Galt, Ont.
Toronto Blower Co., Toronto, Ont.
U. S. Steel Tank & Pipe Co., Chicago.

BLOW PIPING
Cyclone Blow Pipe Company.
Ormsby, Limited, A. B., Toronto.
Sheldons Limited, Galt, Ont.
Toronto Blower Co., Toronto, Ont.
U. S. Steel Tank & Pipe Co., Chicago.

BOILERS
Canada Machinery Agency, Montreal.

BORING MACHINES
American Woodworking Machinery Company, Rochester, N.Y.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Mussens, Limited, Montreal.
J. M. Nash, Milwaukee, Wis.
Valley City Machine Works, Grand Rapids, Mich.
Williams Machinery Company, A. R., Toronto.

BOX MAKERS' MACHINERY
American Woodworking Machinery Company, Rochester, N.Y.
Canadian Linderman Co., Ltd.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.

CABINET PLANERS
Buss Machine Works, Holland, Mich.
Canada Machinery Corporation, Ltd., Galt, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Agency, Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Valley City Machine Works, Grand Rapids, Mich.
Baxter D. Whitney & Son, Wichendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Ltd., Toronto.
Williams Machinery Co., A. R., Toronto.

CARS (transfer)
Sheldons Limited, Galt, Ont.

CARVING MACHINES
American Woodworking Machinery Company, Rochester, N.Y.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Hespeler Machinery Co., Ltd., Hespeler, Ont.
Valley City Machine Works, Grand Rapids, Mich.

CHISELS
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

CIRCULAR SAW MILLS
Canada Machinery Agency, Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.

CHAINS (Silent)
Jones & Glassco, Montreal

CLAMPS (Chain, Carpenter, Cabinet, Pattern Makers, Bench, Mitre, Piling, Mounted and Rotary Wheel)
Adjustable Clamp Company, Chicago.
Batavia Clamp Company, Batavia, N.Y.
Black Bros. Machinery Company, Mendota, Ill.
Batavia Clamp Company, Batavia, N.Y.
Black Bros. Machinery Co., Mindota, Ill.
J. A. Fay & Egan Co., Cincinnati, Ont.

CLAMPS (Saw)
Adjustable Clamp Company, Chicago.
Batavia Clamp Co., Batavia, N.Y.
Black Bros. Machinery Company, Mendota, Ill.
Shurly Dietrich Co., Ltd., Galt, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

CLUTCHES
J. A. Fay & Egan Co., Cincinnati, Ohio.

COLUMN CLAMPS
Black Bros. Machinery Co., Mendota, Ill.

COLUMN MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.

CORE BOX MACHINES
J. A. Fay & Egan Co., Cincinnati, Ohio.
Chicago Machinery Exchange, Chicago, Ill.
E. & B. Holmes Machinery Co., Buffalo, N.Y.

CUT-OFF SAWS
Canada Machinery Corporation Ltd., Galt, Ont.
Shurly Dietrich Co., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Berlin Machine Works, Ltd., Hamilton, Ont.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

CUTTER HEADS
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Lamson Cutter Head Company.
Samuel J. Shimer & Sons, Galt, Ontario.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.

DADO HEADS
C. Mattison Machine Works, Beloit, Wis.
Fox Machine Company, Grand Rapids, Mich.
W. A. Elliott, Bathurst and College Sts., Toronto.

DIEMAKERS & MACHINISTS
W. H. Dunne, 1492 Queen St. West, Toronto.

DISK GRINDERS
J. A. Fay & Egan Co., Cincinnati, Ohio.

DOGS (Saw Mill)
J. A. Fay & Egan Co., Cincinnati, Ohio.

DOVETAILING MACHINES
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canadian Linderman Machine Co., Ltd., Woodstock, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

DOWEL MACHINES
American Woodworking Machinery Company, Rochester, N.Y.
Thos. White & Sons, Paisley, Scotland.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Dauber-Bell Machine Company.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Valley City Machine Works, Grand Rapids, Mich.

DRYING MACHINERY
Morton Dry Kiln Co., Chicago, Ill.
Sheldons Limited, Galt, Ont.

DRY KILNS
Morton Dry Kiln Company, Chicago, Ill.
Sheldons Limited, Galt, Ont.
Standard Dry Kiln Co., Indianapolis.

DUST COLLECTORS
Ormsby, Limited, A. B., Toronto.
Cyclone Blow Pipe Company, Chicago.
Sheldons Limited, Galt, Ont.
U. S. Steel Tank & Pipe Company, Chicago.

DUST SEPARATORS
Sheldons, Limited, Galt, Ont.

EDGERS (Gang)
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machinery Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.
Williams Machinery Company, A. R., Toronto.

EDGERS (Single Saw)
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Agency, Montreal.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

END MATCHING MACHINE
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

EXHAUST FANS
Cyclone Blow Pipe Company, Chicago.
Sheldons, Limited, Galt, Ont.
U. S. Steel Tank & Pipe Co., Chicago.

FLOORING MACHINES
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corporation, Ltd., Galt, Ont.
Baxter D. Whitney & Son, Winchendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.

FLINT
Wausau Quartz Co., Wausau.

FLUTING HEADS
J. A. Fay & Egan Co., Cincinnati, Ohio.

FLUTING AND TWIST MACHINE
Pryibil Machine Co., P., New York.

GAINING MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Canada Machinery Corporation, Ltd., Galt, Ont.
H. W. Petrie, Limited, Toronto.
Williams Machinery Co., A. R., Toronto.

GAS ENGINES
H. W. Petrie, Limited, Toronto.

GAUGES (Saw)
Shurly Dietrich Co., Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.

GLUE
National Process Co., Indianapolis, Ind.
Perkins Glue Company, South Bend, Ind.

GLUE CLAMPS
Adjustable Clamp Company, Chicago.
Batavia Clamp Company, Batavia, N.Y.
Black Bros. Machinery Co., Mendota, Ill.
H. W. Petrie, Limited, Toronto.

GLUE HEATERS
J. A. Fay & Egan Co., Cincinnati, Ohio.

GLUE JOINTERS
American Woodworking Machinery Company, Rochester, N.Y.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canadian Linderman Company, Limited, Woodstock, Ont.
Chicago Machinery Exchange, Chicago, Ill.

GLUE SPREADERS
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

GLUE ROOM EQUIPMENT
Chas. E. Francis Co., Rushville, Ind.

GRINDERS (Cutter)
J. A. Fay & Egan Co., Cincinnati, Ohio.

GRINDERS (Knife, etc.)
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.

GRINDERS (Tool)
J. A. Fay & Egan Co., Cincinnati, Ohio.
Valley City Machine Works, Grand Rapids, Mich.

GROOVING HEADS
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Samuel J. Shimer & Sons, Milton, Pa.
Canada Machinery Corporation, Ltd., Galt, Ont.

GUARDS (SAW)
Porter Machinery Co., C. O., Grand Rapids, Mich.

GUMMERS, ETC.
E. C. Atkins & Co., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

HAND PROTECTORS
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Jones Safety Device Co., Hamilton, Ont.

HARDWARE SPECIALTIES
Reflector & Hardware Mfg. Co., Chicago.

HAND SCREWS
Black Bros. Machinery Co., Mendota, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

HANDLE AND SPOKE MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
J. M. Nash, Milwaukee, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.

HUB MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

HYDRAULIC VENEER PRESSES
Wm. R. Perrin & Co., Ltd., Toronto.

JOINTERS
Buss Machine Works, Holland, Mich.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Canadian Linderman Co., Ltd., Woodstock, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Plessisville Foundry, Plessisville, Que.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

KNIVES (Planers and Others)
Canada Machinery Corporation, Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Samuel J. Shimer & Sons, Milton, Pa.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.

LATHES (Pattern Makers')
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Valley City Machine Works, Grand Rapids, Mich.
Thos. White & Sons, Paisley, Scotland.

LATHES (Turning)
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Valley City Machine Works, Grand Rapids, Mich.
Baxter D. Whitney & Son, Winchendon, Mass.
H. W. Petrie, Limited, Toronto.

LOOSE PULLEYS
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corporation, Ltd., Galt, Ont.

LUBRICANTS AND GREASES
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.

LUMBER
Anderson Lumber Company, C. G.
East St. Louis Walnut Co., East St. Louis, Ill.
Timms, Phillips & Co.

MACHINE KNIVES
Walters & Sons, H., Hull, Que.

MITRE MACHINES
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N. Y.
H. W. Petrie, Limited, Toronto.

MITRE CLAMPS
Adjustable Clamp Company, Chicago.
Batavia Clamp Company, Batavia, N.Y.
Black Bros. Machinery Co., Mendota, Ill.

MITRE SAWS
Shurly Dietrich Co., Ltd., Galt, Ont.
E. C. Atkins & Co., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corporation, Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

MORTISING MACHINES
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corporation, Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Jones & Glassco, Montreal.
Valley City Machine Works, Grand Rapids, Mich.
H. W. Petrie, Limited, Toronto.

MULTIPLE BOXING MACHINES
J. A. Fay & Egan Co., Cincinnati, Ohio.
J. M. Nash, Milwaukee, Wis.

PACKINGS
Both Felt Company

PAINTS AND VARNISHES
Advance Paint Co., Indianapolis.
Jamieson & Co., R. C., Montreal.
Marietta Paint & Color Co., Marietta, Ohio.

PATENT SOLICITORS
H. J. S. Dennison.

PATTERN SHOP MACHINES
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.
E. & B. Holmes Machinery Co., Buffalo, N.Y.

PICTURE FRAME MACHINERY
Black Bros. Machinery Co., Mendota, Ill.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.

PLANERS
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.
Porter Mach. Co., C. O., Grand Rapids, Mich.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.

PLANING MILL MACHINERY
American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Chicago Machinery Exchange, Chicago, Ill.
C. Mattison Machine Works, Beloit, Wis.
Pryibil Machine Co., P., New York, N.Y.
Samuel J. Shimer & Sons, Milton, Pa.
Baxter D. Whitney & Son, Winchendon, Mass.
Black Bros. Machinery Co., Mendota, Ill.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
Williams Machinery Co., A. R., Toronto.

POLISHING MATERIAL
Gray & Company, H.

PULLEYS
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

RESAWS
American Woodworking Machinery Company, Rochester, N.Y.
Shurly Dietrich Co., Ltd., Galt, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
H. W. Petrie, Limited, Toronto
Williams Machinery Co., A.R., Toronto.

RIM AND FELLOE MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corp., Ltd., Galt, Ont.

RIP SAWING MACHINES

American Woodworking Machinery Company, Rochester, N.Y.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Canada Machinery Corp., Ltd., Galt, Ont.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
Sinker-Davis Co., Indianapolis, Ind.
Williams Machinery Co., A. R., Toronto.

SAFETY GUARDS (For Band Saw Machines, Jointers, Rip Sawing Machines, Shapers, Swing Saws, etc.)

Chicago Machinery Exchange, Chicago, Ill.
Fair Manufacturing Company, Racine, Wis.
Jones Safety Device Co., Hamilton, Ont.
Porter Mach. Co., C. O., Grand Rapids, Mich.

SANDERS

American Woodworking Machinery Company, Rochester, N.Y.
Black Bros. Machinery Co., Mendota, Ill.
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
J. M. Nash, Milwaukee, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Fisher Sander Co., Berlin, Ont.
Elliot Woodworker Co., Toronto.

SANDPAPER

Black Bros. Machinery Co., Mendota, Ill.

SANDERS (Moulding, Belt and Panel)

Black Bros. Machinery Co., Mendota, Ill.
Curtis Machine Corporation, Jamestown, N.Y.
Chicago Machinery Exchange, Chicago, Ill.
H. W. Petrie, Ltd., Toronto.

SASH, DOOR INTERIOR TRIM AND COLUMNS

M. Brennan & Sons, Hamilton, Ont.

SASH, DOOR AND BLIND MACHINERY

American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Samuel J. Shimer & Sons, Milton, Pa.
Black Bros. Machinery Co., Mendota, Ill.
Williams Machinery Co., A. R., Toronto.

SAWS (Hand)

Shurly Dietrich Co., Ltd., Galt, Ont.
E. C. Atkins & Co., Hamilton, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.
Simonds Canada Saw Co., Montreal.
R. H. Smith Co., Ltd., St. Catharines, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.

SAW MILL MACHINERY

Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Williams Machinery Co., A. R., Toronto.

SAW SWAGES, AUTOMATIC FILERS

E. C. Atkins & Co., Hamilton, Ont.
Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.

SAW TABLES

Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
E. & B. Holmes Machinery Co., Buffalo, N.Y.

SCRAPING MACHINES

American Woodworking Machinery Company, Rochester, N.Y.
Baxter D. Whitney & Son, Winchendon, Mass.
Chicago Machinery Exchange, Chicago, Ill.

SCROLL SAWS

Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Shurly Dietrich Co., Ltd., Galt, Ont.
E. C. Atkins & Co., Hamilton, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.

SECOND HAND MACHINERY

Chicago Machinery Exchange, Chicago, Ill.
H. W. Petrie, Limited, Toronto.
Williams Machinery Co., A. R., Toronto.

SHAPERS

American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Buss Machine Works, Holland, Mich.
Canada Machinery Corp., Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Samuel J. Shimer & Sons, Milton, Pa.
Baxter D. Whitney & Son, Winchendon, Mass.
H. W. Petrie, Limited, Toronto.

SHELLAC

Advance Paint Co., Indianapolis.
Jamieson & Company, R. C., Montreal.

SHAVING COLLECTORS

Cyclone Blow-Pipe Company, Chicago.
Ormsby Company, A. B., Toronto.
Sheldons, Limited, Galt, Ont.
Toronto Blower Company.
United States Steel Tank & Pipe Co., Chicago.

SINGLE SPINDLE BOXING MACHINES

Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.

STAINS

Advance Paint Co., Indianapolis, Ind.
Marietta Paint & Color Co., Marietta, Ohio.

STAVE SAWING MACHINE

Baxter D. Whitney & Son, Winchendon, Mass.

STORE FIXTURES AND FITTINGS

Reflector & Hardware Specialty Mfg. Co. Chicago, Ill.

SURFACERS

American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Buss Machine Works, Holland, Mich.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Baxter D. Whitney & Son, Winchendon, Mass.
Chicago Machinery Exchange, Chicago, Ill.
E. & B. Holmes Machinery Co., Buffalo, N.Y.
H. W. Petrie, Limited, Toronto.
Williams Machinery Co., A. R., Toronto.

SWING SAWS

Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
The A. J. Burton Saw Co., Ltd., Vancouver, B. C.
E. & B. Holmes Machinery Co., Buffalo, N.Y.

TABLE LEG LATHES

Berlin Machine Works, Ltd., Hamilton, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Thos. White & Sons, Paisley, Scotland.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.

TENONING MACHINES

American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Williams Machinery Co., A. R., Toronto.

TOOLS (Hand)

J. A. Fay & Egan Co., Cincinnati, Ohio.
Samuel J. Shimer & Sons, Milton, Pa.

TRIMMERS

Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.

TRUCKS

Buss Machine Works, Holland, Mich.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Sheldons, Limited, Galt, Ont.

TURNING MACHINES

American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
C. Mattison Machine Works, Beloit, Wis.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass.
H. W. Petrie, Limited, Toronto.

UNDER-CUT SELF-FEEDING FACE PLANER

J. A. Fay & Egan Co., Cincinnati, Ohio.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.

UNIVERSAL WOODWORKER PLANER

Canada Machinery Agency, Montreal.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
W. A. Elliot, Bathurst St., Toronto, Ont.
H. W. Petrie, Limited, Toronto.

VARNISHES

Jamieson & Company, R. C., Montreal.
Advance Paint Co., Indianapolis, Ind.

VENEERS

Hoffman Bros. Co., Fort Wayne, Ind.
Haughton Veneer Company, Chicago.
Ohio Veneer Company, Cincinnati, Ohio.
Central Veneer Company, Indianapolis, Ind.
Goshen Veneer Company, Goshen, Ind.
Hossafous, H. C., Dayton, Ohio.
Huddleston Marsh Lumber Co., Chicago.
Acme Veneer & Lumber Co., Cincinnati, Ohio.
Adams & Raymond Veneer Co., Indianapolis.
Veneer Manufacturers Company, Chicago.
National Veneer & Lumber Co., Indianapolis.
Thompson Veneer Co., W. T., Edinburgh.
Wabash Veneer Co., Wabash, Ind.

VENTILATING APPARATUS

Sheldons, Limited, Galt, Ont.

VENEER PRESSES (Hand and Power)

Hydraulic Press Mfg. Co., Mount Gilead, Ohio.
Black Bros. Machinery Co., Mendota, Ill.
Francis Company, Charles E.
William R. Perrin & Company, Toronto, Ont.

VISES (Band Saws)

Shurly Dietrich Co., Ltd., Galt, Ont.
Simonds Canada Saw Co., Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.

VISES (Pattern Makers')

J. A. Fay & Egan Co., Cincinnati, Ohio.

VISES (Circular Saws)

E. C. Atkins Co., Hamilton, Ont.
J. A. Fay & Egan Co., Cincinnati, Ohio.
The A. J. Burton Saw Co., Ltd., Vancouver, B.C.

WAGON AND CARRIAGE MACHINERY

American Woodworking Machinery Company, Rochester, N.Y.
Berlin Machine Works, Ltd., Hamilton, Ont.
Canada Machinery Corp., Ltd., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
J. A. Fay & Egan Co., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, O.
Baxter D. Whitney & Son, Winchendon, Mass

WASTE, COTTON

Gray & Company, H.

WIPING MATERIAL

Gray & Company, H.

WINDOW FRAME MACHINERY

Smith & Phillips Mfg. Co., Chicago, Ill.

WOOD PULLEYS

Canada Machinery Agency, Montreal.
Williams Machinery Co., A. R., Toronto.

WORK BENCHES

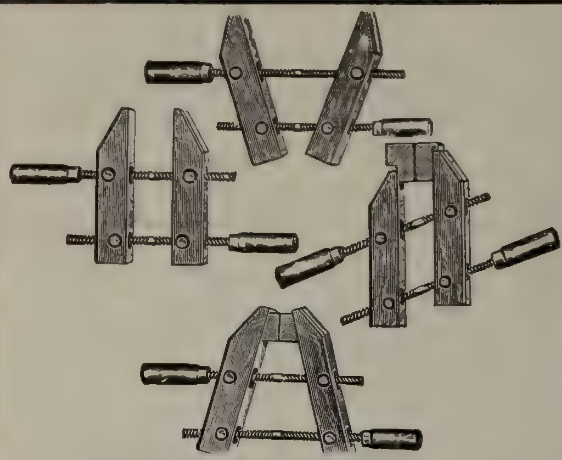
Canada Machinery Agency, Montreal.
J. A. Fay & Egan Co., Cincinnati, Ohio

WOOD PLUG MACHINE

Eagle Machine Works, Indianapolis, Ind.

WOOD SCREWS

P. L. Robertson & Company, Milton, Ont.



It Should Be Interesting

To know that the JORGENSEN HAND SCREW has proved itself to be so durable that we replace without charge any broken part. This guarantee costs us little, and yet we sell 4,000 dozens a year. Just think of this the next time you figure on the wooden spind e kind that you know you will SOON PAY TO REPLACE if you buy it. The JORGENSEN is in every way a superior tool—but little difference in the first cost.

Adjustable Clamp Company
215 N. Jefferson St., Chicago, Ill.

COLT'S CLAMPS

QUICK ACTING **Eccentric STEEL BAR Screw** **TIME SAVERS**

We have just the clamp to fit your special needs. We will supply you direct or if you prefer write us for the name of a Canadian Dealer.

Ask for catalog No. 187.

Batavia Clamp Co.

157 Center Street, Batavia, N.Y.

Makes Wooden Plugs from Scraps

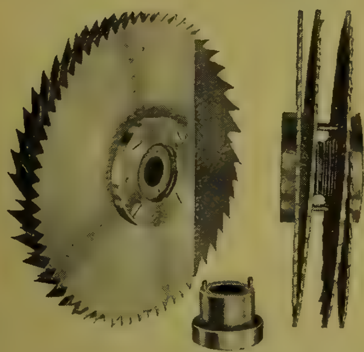
The demand for wooden plugs to jam in the ends of big rolls of paper is much greater than the supply. The paper mills can't secure enough of them.

This machine automatically makes 20,000 of these plugs in ten hours, from short stock and scraps around the plant. We have full particulars which we will be glad to send you. Testimonials? Yes, lots of them. Better write us to-day.

EAGLE MACHINE WORKS
332 Market St., INDIANAPOLIS, Ind., U. S. A.

Trade **FOX** Mark

ADJUSTABLE



DADO HEADS

These heads, when open, cut a groove twice the width of groove cut with head closed, and they will cut absolutely any width between these extremes.

Write for Descriptive Literature

FOX MACHINE CO.

645 Front Ave., N.W., GRAND RAPIDS, MICH.

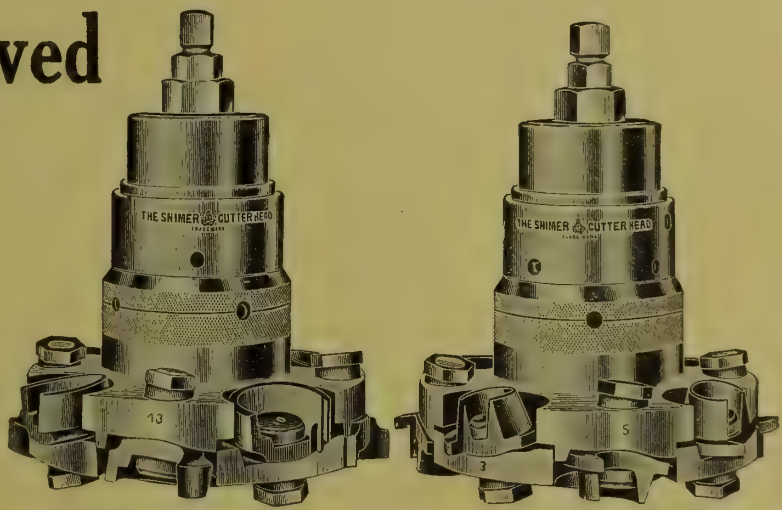
Drying of Veneers and Hardwood Flooring

BECAUSE of its perfect adaptability, the Moist Air System of The Standard Dry Kiln acts with ***simplicity*** and ***certainty*** on veneers and hardwood flooring.

The Standard Dry Kiln offers the *cheapest-per-year* method of drying your product as you want it dried. We guarantee its success and your satisfaction. Write for the catalog. Address : The Standard Dry Kiln Co., 1560 McCarty St., Indianapolis, Ind.

Every Hour Saved

By the Use of The Shimer Limited Cutter Heads



Adds to the capacity of your mill. These heads are built especially for the High Speed Matcher and will tongue and groove flooring at 150 to 170 lineal feet or more per minute.

They are self-centered on the spindles by means of a chucking device which grips firmly thereto when drawn up, insuring all the cutters doing their share of the work and removing the objectionable set screw which has hitherto been used for fastening purposes.

The Bits carry a larger areal surface and the Bit chambers are of greater depth to compensate for the new acute angle given to the Bits for greater relief to the parts coming into contact with the lumber.

Price, net, in solid section, complete for making flooring $67.00. With Expansion feature like illustrations $72.46.

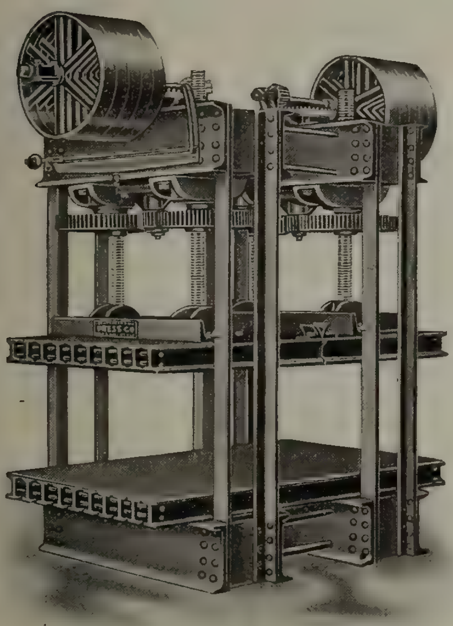
SAMUEL J. SHIMER & SONS, Galt, Ont. Can.

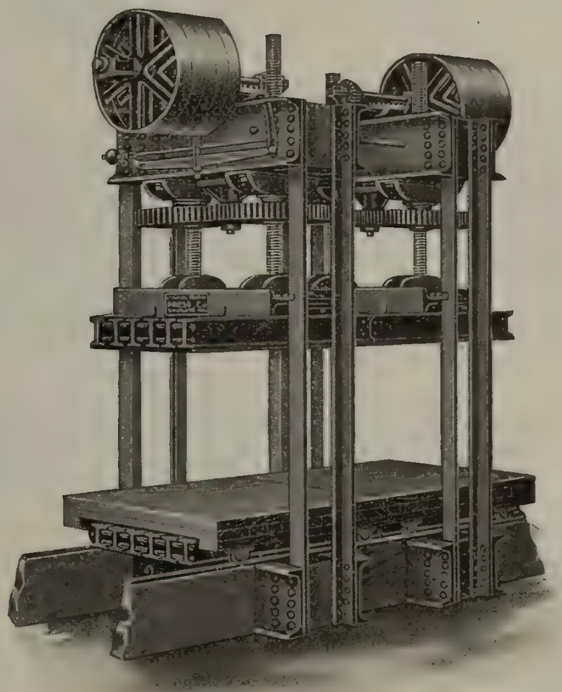

A New One
MARIETTA
WOOD
FINISH
SPECIALISTS
This Mahogany stain is non-fading
Does not put the water back into the wood that the kiln took out. Does not raise the grain.
It does do away with the repair department, because it does its work thoroughly.
It does fill perfectly and dry hard over night. It does have a low percentage of evaporation.
It does fill a long felt want in the furniture making industry, because it has every virtue of a water stain, with none of its disadvantages.
Don't forget it. GET IT. 1914XXX Mahogany Stain.
May be applied either with brush or by dipping.
Write for sample panel or special demonstration.
The Marietta Paint & Color Co.
Marietta, Ohio.

Veneer Presses

Power Screw   Hydraulic

All Styles   All Sizes



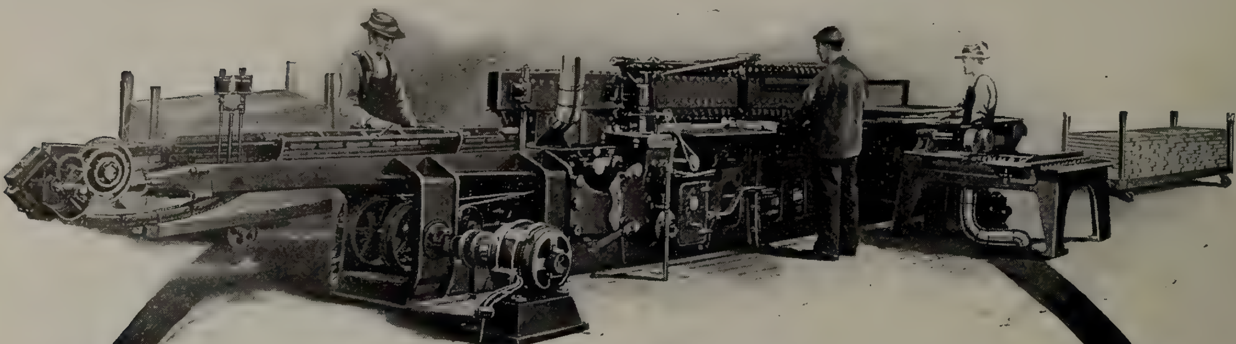


Track and Car Systems
Transfer Cars

BULLETIN C 1 will be sent upon request

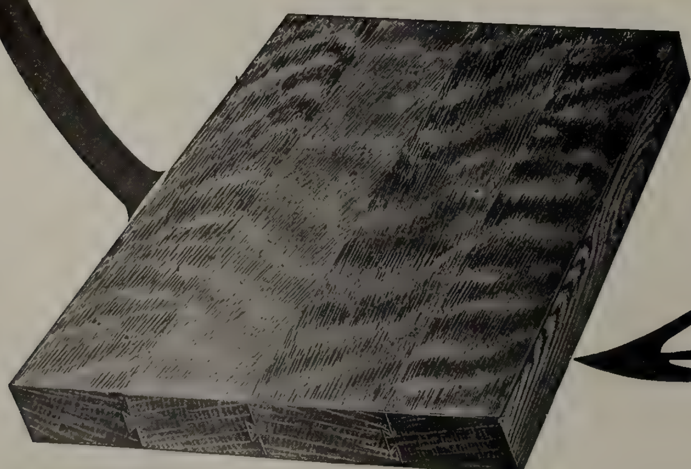
Canadian Boomer & Boschert Press Co.
Montreal   Limited

The Keynote of Efficiency in Jointing Lumber



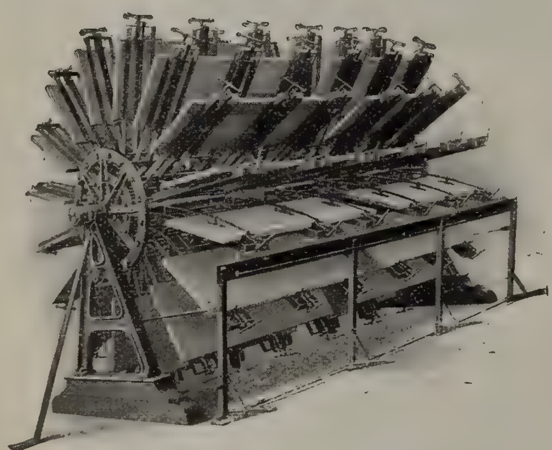
GETTING along nicely and getting the utmost from your jointing department are two points that are a considerable distance apart when profit and efficiency are concerned. If you use more than one machine to make your panels to the exact width your factory has not struck the exact keynote of efficiency in lumber jointing, you have not reached that point of economy, the saving of time, labor, lumber and glue that hundreds of furniture manufacturers in Canada and the United States are deriving from jointing lumber by one automatic operation on the

LINDERMAN AUTOMATIC DOVETAIL GLUE JOINTER

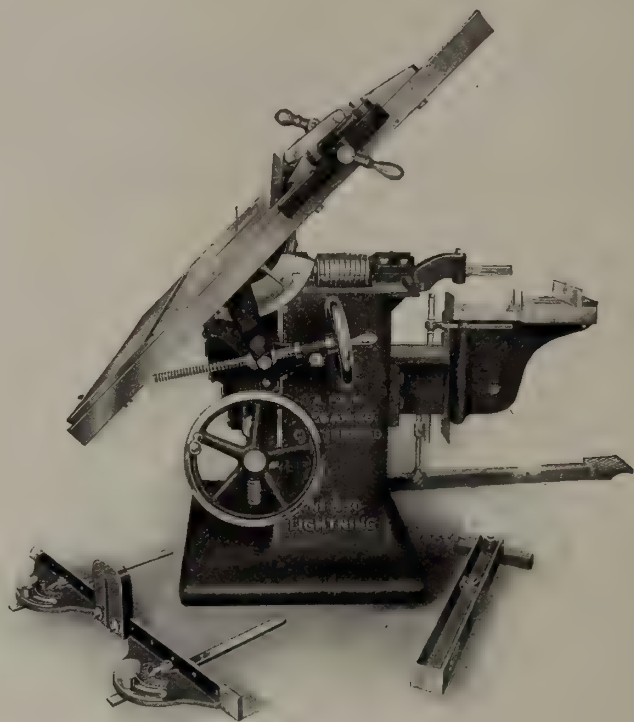


Canadian Linderman Machine Co.

Works at: WOODSTOCK, ONT. MUSKEGON, MICH.

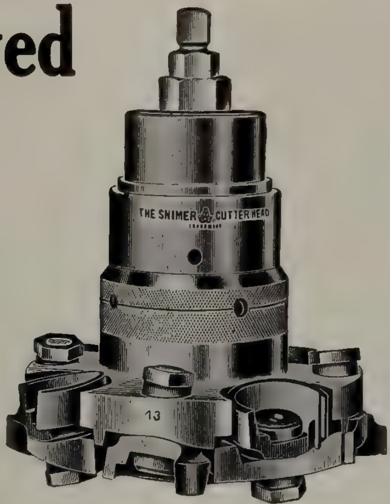


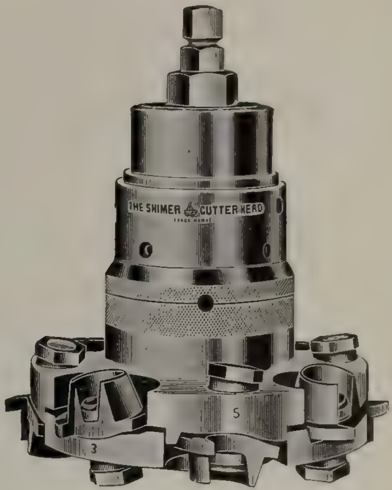
Patented April 13, 1909: October 10, 1911
Canadian Patent Aug. 10, 1909



Every Hour Saved

By the Use of The Shimer Limited Cutter Heads





Adds to the capacity of your mill. These Heads are built especially for the High Speed Matcher and will tongue and groove flooring at 150 to 170 lineal feet or more per minute.

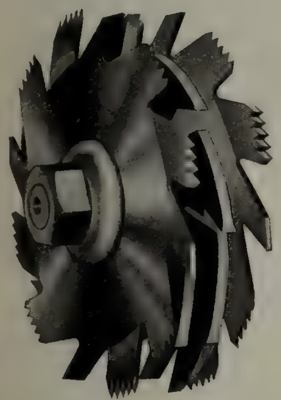
They are self-centered on the spindles by means of a chucking device which grips firmly thereto when drawn up, insuring all the cutters doing their share of the work and removing the objectional set screw which has hitherto been used for fastening purposes.

The Bits carry a larger areal surface and the Bit chambers are of greater depth to compensate for the new acute angle given to the Bits for greater relief to the parts coming in contact with the lumber.

Price, net, in solid section, complete for making flooring $67.00. With Expansion feature like illustration, $72.46, complete.

SAMUEL J. SHIMER & SONS, - GALT, ONT., CAN.

Patent Groover or Dado Head



Can be used on any Circular Saw Mandrel.

For cutting any width groove, from ⅛ inch to 2 inches or over.

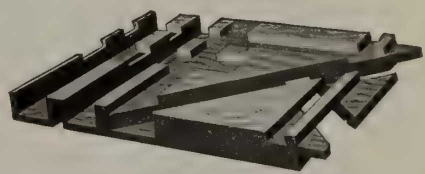
This groover consists of two outside saws, each of which is a groover in itself, and as many inside cutters as required.

The inside cutters are made 1/16, ⅛ and ¼ inch thick, so that any width groove measurable in sixteenths may be cut.

The outside cutters are made ⅛ inch thick.

It will cut a perfect groove, either with or across the grain, and will not leave a rough edge as is the case with ordinary groovers.

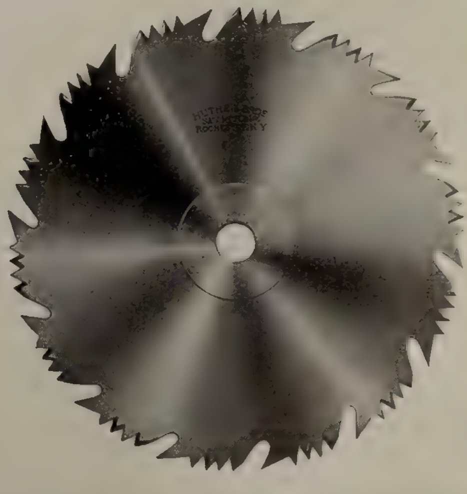
We will guarantee to sell you the best Dado on the market and will send on approval to any responsible party and if not satisfactory in every respect it can be returned at our expense.



Will cut a perfect groove with or across the grain.

Circular Mitre Saws With Cleaner Tooth

This saw can be made for either ripping or cross-cutting. When used for ripping we put in a greater number of cleaner teeth than when used for cross-cutting. It will cut equally as smooth in either ripping or cross-cutting and is an excellent saw where there is a little of each, and the operator does not wish to take time to change saw between jobs.



Huther Bros. Saw Mfg. Company

Rochester, N. Y., U. S. A.

"Hutchinson" Combination Woodworker

Particularly adopted for

Cutting Studs, Rafters, Braces, Boring for Dowelling, Tenoning, Dadoing, Pulley Stiles, Window Sills and Door Jams, Routing, Stair Stringers, Mitering of any kind, Sandpapering, Ripping, Tool Grinding, etc.

For simplicity of construction, efficiency, durability, portability, rapidity and accuracy of working, there is no other machine on the market to equal the "Hutchinson"

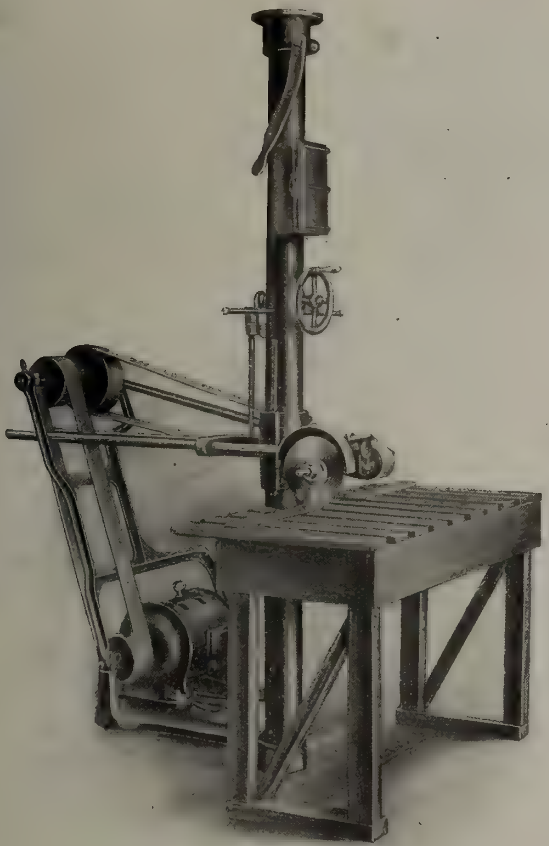


Fig. 1

With 3 H. P. Motor attached. Motor is attached to iron base plate with rollers adjusted at the bottom and the saw placed at any angle by the steel rod through post as shown in cut. The saw carriage is operated by a hand lever which is carried on two steel rods that slides through babitted bearings in the sleeve and has vertical slide of 24-in. on the centre post. The saw will cut 6 x 16 lumber, and 12 x 12 timber can be cut by turning the stick. The mandrill is raised or lowered by the hand wheel and is held in position by the clutch on top as shown in cut. This machine will do the rough as well as the finish work.

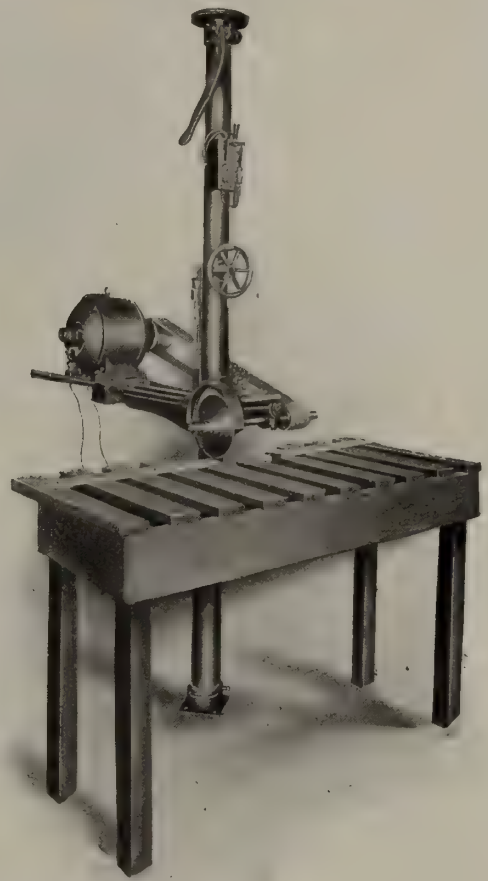


Fig. 2

Fig, 2, shown above, is a Money Saver in the Shop or on the Building and can be attached to any ordinary electric wires. It is of the same construction as Fig. 1, except that the motor is so attached to the two steel rods and slides with the saw. This machine is more adapted for lighter work, is operated by a 1 horse-power motor, and has no trouble in cutting 4-in. plank. The Iron Column is set with an Iron Base. The Clutch holding the column in position is on top of this Iron Base, and is set by a lever under the bench. This machine is recommended for its portability.

PROOF OF SAVING THIS MACHINE WILL EFFECT

Mr. M. Hutchinson, Toronto

Dear Sir:—In regard to the machine you installed in my factorv, I have given it a fair trial and found it very satisfactory.

I have just finished an order for sorting cases for the Toronto Post Office, in which there were 5000 saw cuts and 1500 dado cuts required.

One man with your machine completed all this in 16 hours, whereas, in the old way, I reckon it would have taken him a couple of weeks.

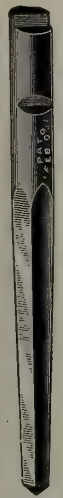
I have also found it a great time-saver in getting out window frame and stair material.

Wishing you continued success, yours truly,

WM. WILLIAMSON,

Office, Mill and Factory: 137-143 Woodbine Ave., Toronto.

MACKINTOSH HUTCHINSON, 5 Duke Street, Toronto, Can.



ROBERTSON SOCKET HEAD

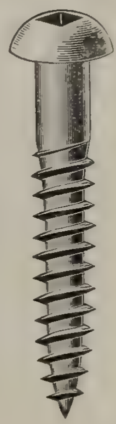
Wood Screws

See That Square Hole

Pat. Feb. 2, 1909

THIS IS A REAL WOOD SCREW

It is driven by a specially designed screw driver which fits snugly into the square hole in the head and there it stays until the work is done. This is the only wood screw of its type on the market and is especially adapted to all work connected with the manufacture of all kinds of furniture.



TRY IT

It is driven with less exertion. The driver does not slip and cut the fingers or disfigure costly furniture or woodwork. No ragged slots after driving. Saves time and labor, money and material. We make the drivers in all suitable styles.

Drivers Free with First Order

Our Goods are Guaranteed *Our Prices are Right*

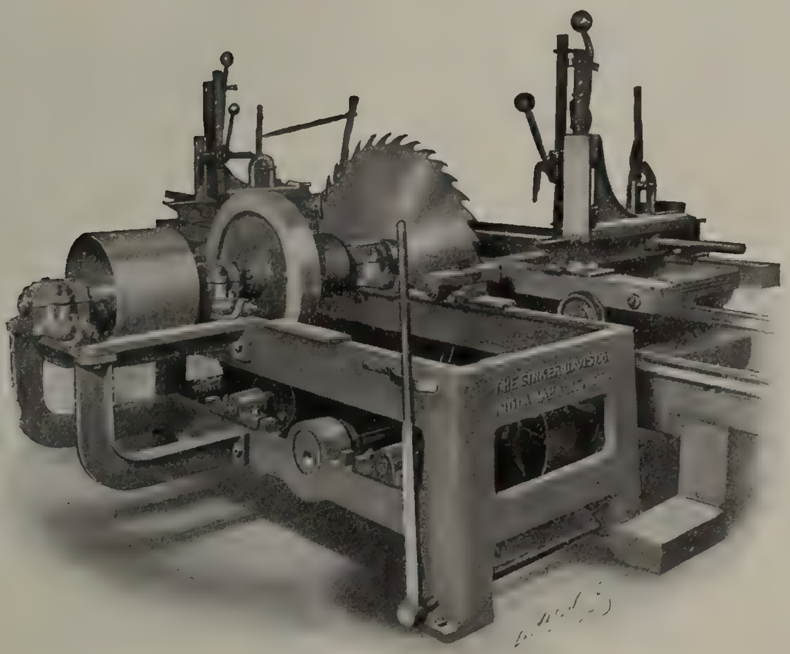
Samples, prices and catalogues on application

The P. L. Robertson Mfg. Co., Limited

MILTON, ONTARIO

THE "HOOSIER"
Short Log Sawing Machine

As well built as our largest mill and does as good work.



The Hoosier Short Log Sawing Machine main frame is cast in one piece, which makes it very rigid and this main frame carries the mandrel and the feed works in self oiling adjustable boxes.

On account of the frame being rigid operator can use a very thin saw. The machine is practically self contained and portable and when shipped from the factory includes the track ways and track. We build blocks and carriages to fit all requirements for handling small logs and veneer cores.

For sawing veneer cores we make our improved and grip dogs that dog the cores in the ends and hold them rigid so that they can be sawed into crating and dimension stock.

For sawing logs whether straight, swell butt or crooked we make a carriage with blocks opening 24-30 and 36-in. with independent knees and **Knight's** pony single or duplex dogs.

All blocks have double acting, crosswise, set works.

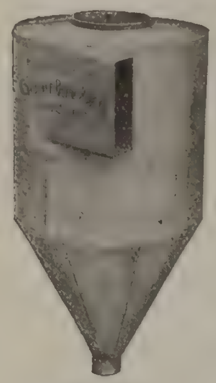
Machine will carry as large as a 54-in. saw and the machine will take care of logs up to 24-in. in diameter.

Write for further particulars regarding this machine and also regarding our New Hoosier Band Saw Mill and our new combination power and hand feed rip saw.

The Sinker Davis Co.

Manufacturers of the New "Hoosier" Band Saw Mill and All Steel Nigger Proof Head Blocks

Indianapolis - - - Indiana



(Patented)

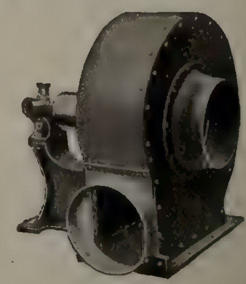
Cyclone Blow Pipe Co.

Improved Cyclone Dust Collectors, Automatic Furnace Feeders, Steel Plate Exhaust Fans, Exhaust and Blow Piping.

Complete systems designed, manufactured, installed and guaranteed. Old systems remodeled on modern lines on most economical plans. Supplementary system added where present systems are outgrown. Defective systems corrected and put in proper working order.

Latest Improved Slow-Speed Systems

Cyclone Blow Pipe Co., Chicago, Ill.



Books For Sale

The following books are offered at special prices subject to previous sale:

Saw Fitting Manual, a treatise on the care of saws and knives. Deals with everything in the saw and knife alphabet, from adjustments to widths. 144 pages. Price $2.00.

Common-sense Handrailing, by Fred T. Hodgson. Published by Frederick J. Drake & Company, Chicago. 114 pages, illustrated. Price 50c.

Roof Framing Made Easy, by Owen B. Maginnis. Published by The Industrial Publication Company, New York. 164 pages, illustrated. Price 50c.

Handrailing Simplified, by An Experienced Architect. Published by William T. Comstock, New York, 52 pages, illustrated. Price 50c.

Practical Centering, by Owen B. Maginnis. Published by William T. Comstock, New York. 80 pages, illustrated. Price 50c.

How to Join Mouldings; or, The Arts of Mitering and Coping, by Owen B. Maginnis. Published by William T. Comstock, New York. 72 pages, illustrated. Price 50c.

The Book of Lumber Shed Construction, by Met. L. Saley. Published by American Lumberman, Chicago. 176 pages, illustrated. Price $1.00.

Furniture Designing and Draughting, by Alvan Crocker Nye. Published by William T. Comstock, New York. 100 pages, illustrated. Price $1.00.

Popular Mechanics Shop Notes, Published by Popular Mechanics, Chicago. Easy Ways to do Hard Things, etc. Years 1905-1906-1907-1908-1909. Price 40c each.

Cabinet Making, by J. H. Rudd. Published by Grand Rapids Furniture Record Company. 210 pages, illustrated. Price $1.50.

Modern Practical Carpentry, by George Ellis. Published by B. T. Batsford, London. 378 pages, illustrated. Price $1.50.

Woodworker Publishing Company, Limited

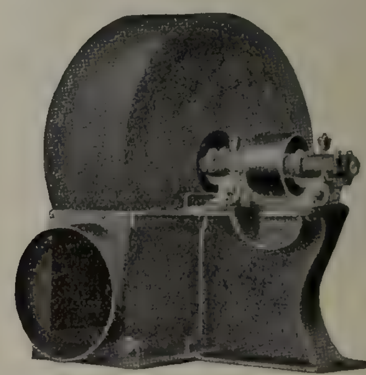
Nicholls Building,

Toronto, - Ontario

WHY you should install the

Mahony Blower

System in your Factory



Fifty per cent. higher efficiency than any other on the market to-day, uses ⅛ less power, costs less to install, no cyclone required, eliminates back pressure on the fan.

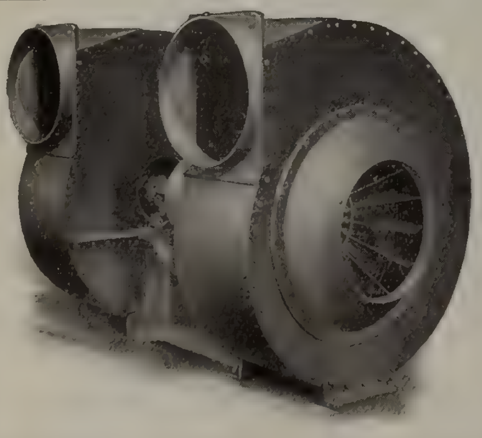
I will undertake to increase the capacity of any system now installed 50 to 100% by the application of the Mahony Back Pressure valve on your fan, without using a scrap more of your horse power.

YOU NEED this apparatus in your plant.

WRITE TO-DAY FOR PRICES

A. MAHONY

512 Wellington West TORONTO



Slow-Speed, Low-Power Shavings and Dust Collecting Systems

Our installations conform to the latest and best practice. New systems designed to fit your present and future requirements. Old systems overhauled and corrected.

The A. B. Ormsby Company, Limited

WINNIPEG ***Blow Pipe Department*** **TORONTO**

Alphabetical List to Advertisers

1913 WILL BE A RECORD YEAR FOR THE SALES

— OF —

Harris Heavy Pressure

THE BABBITT METAL WITHOUT A FAULT

HARRIS HEAVY PRESSURE makes sunshine for the Engineer and Machinist.

It is a High-grade Babbitt at a medium price, recognized as

The Best Babbitt Metal

for all general machinery bearings, and answers in 95 cases out of 100 where Genuine Babbitt is used.

If Your Dealer cannot supply you order from our nearest factory

THE CANADA METAL CO., Limited

Head Office and Factory: FRASER AVENUE TORONTO

Branch Factories: 50 Brennan Street, MONTREAL 301 Chambers Street, WINNIPEG

W. A. Martin & Co.

Engineering Apparatus and Supplies

Sole Agents

DARWIN & MILNER'S
(Sheffield)
High-Speed Tool Steels

"DUROR"
Triple Life
Files and Hackshaw Blades

"GRIPOLY" and "ROKO"
Solid Woven Hair Belting
In Double Quality

"LANT"
Solid Woven Cotton Belting
In Single Quality

Special Extra and Standard Leather Belting

Crescent Belt Fasteners

Reavell's Patent Air Compressors **Ball Bearing Electric Motors Air Cooled**

70 Lombard Street Phone Main 4918 TORONTO

Canadian Woodworker

A Monthly Publication in the Interest of the Woodworking Industry. Reaches the factories producing interior finish, doors, sash, flooring, woodenware, furniture, pianos, boxes, and general mill products.
Subscription, $1.00 a year; foreign $1.50.

Woodworker Publishing Company, Limited

Branches: Montreal, Vancouver, Chicago, New York, London, Eng.

Nicholls Building, Toronto
Phone Ade. 929

Vol. 14 | **December, 1913** | **No. 12**

Raising the Status of the Woodworking Industry

THE status of the woodworking industry in this country will undoubtedly be raised in the near future if the present scheme of the Ontario Provincial Government and the University of Toronto is brought to a successful issue. For some time past the necessity of doing something practical for the better education of woodworkers has been felt keenly. There has been a well-defined sentiment favoring improvement along the line of specialized technical training which it is hoped will have the effect, in this important industry at least, of turning out workers who will be able to put their technical training into practice so that they will be capable of using a trained hand and a cultivated brain in the performance of their daily work. The example of European countries such as England, Germany, France and Italy is being followed closely by educationists on this continent, and an impetus has been given which promises to develop into something profitable for the future industrial workers of the Dominion.

In this issue of the Canadian Woodworker there appears an article which establishes a connection between educational facilities and the future development of the industry. In it reference is made to the collection of examples of some of the best period furniture procured from European countries which at present finds a place in the Royal Ontario Museum of Archaeology. The object of this collection, to which it is hoped substantial additions will shortly be made, is to show the woodworker with the aid of living examples how to do things in the proper way. Ontario being the pioneer wood-growing province, it is but natural that it should take the initiative in this matter and that the Provincial Government in conjunction with the University of Toronto should take effective steps to place the future educational requirements of the industry on a permanent basis. Our technical schools are doing excellent work for the industrial population, recognizing that the future of the country depends largely upon the efficiency and high training of our workers.

It has been proved conclusively that there are few things which cannot be manufactured in Canada to advantage. With this in mind the Technical School of Toronto is giving adequate attention to the educational needs of every industry, special consideration being given to the development and establishment of those industries whose raw material is a natural product in Canada. The new Central Technical School, Toronto, which is now being built on a site nearly six acres in extent, is designed to provide accommodation for all branches of woodworking in addition to other industrial occupations. That this policy meets with the whole-hearted endorsement of employers of labor is shown by the annual scholarships which manufacturers and others have provided to encourage pupils to continue their industrial course to completion. Practical work for the young man engaged in woodworking trades is afforded. This includes laying out and constructing newels, hardwood finishing, complete staircases and other problems. Manufacturers have the greatest difficulty in securing well-trained mechanical experts to act as foremen, superintendents, and managers. Not only must such men be well up in actual trade practice, but also they must know the theory of their work. The dearth of competent executive men for the shops impairs the industrial efficiency of Canadian factories more than anything else. Comparatively few of these men can be recruited from the mechanics of this country because of the lack of technical education facilities. The result is that many of the factory executives, as well as not a few of the highest paid artisans, are recruited from the industry of Great Britain and the United States where technical education has been established for many years. The Industrial Education Act, 1911, which has been put into operation in a considerable number of the manufacturing centres, has paved the way for placing such facilities at the disposal of our citizens, and the new technical school at Toronto will be amongst the best equipped in existence, the aim being to base the system of technical education on the actual doing of things, and to meet the needs of individual workers as far as possible. When it is stated that about five hundred men are at present attending the evening classes for instruction in various mechanical subjects—woodwork, draughting and such like—some idea of the incalculable value of technical education will be formed.

Provision has been made in the new technical school building for practical instruction in claywork-ing, pottery, etc., for the benefit of men who are actually doing the work and seeking higher attainment in their trade, for it is through the technical school only that a higher standard of workmanship can be established in the near future. Briefly stated, the woodworking industry of Canada has entered on an important stage of development, both educationally and commercially, and it is earnestly to be hoped that the efforts to secure national recognition in the form of a substantial grant in connection with the vote for technical education will be successful, in order that this fast growing industrial country may develop to the

full extent of her unlimited natural resources. The movement is essentially a forward one, and we wish it all success. That the Ontario Educational authorities are doing a truly beneficent work in raising the status of the industrial population in general and that of the woodworking industry in particular, cannot be gainsaid, and we hope that in time its influence will extend to every portion of the Dominion.

Brief Mention of Special Articles in This Issue

IN addition to the article which is the topic of our leading editorial, there are a number of special features in this issue which we believe will be found valuable as offering practical suggestions to the industry. Special interest attaches to the articles descriptive of the plants of the Phillips Manufacturing Company, Limited, and Canada Furniture Manufacturers, Limited. These articles are not descriptive in the same sense that is generally understood, for the greatest care has been taken in their preparation to emphasize details of design and construction and to explain manufacturing methods worthy of emulation. For instance, in the article relating to the Woodstock plant, extended mention is made of the construction and equipment of the kiln. The action of live steam upon warped and twisted lumber is discussed at some length. This may be found especially interesting to those who have experienced trouble with lumber affected by atmospheric conditions. The evolution of the modern dry kiln is traced in an article by E. U. Kettle, who emphasizes the importance of uniform circulation and brings out some strong points in favor of the humidity control process. Instructive pointers looking to economy in operation and production may be obtained from the article by Harold V. Coes, who states clearly and concisely the general principles which should govern the layout of the woodworking plant. The question of illumination is of prime importance in any industrial plant and its particular relation to woodworking and furniture factories is established by J. R. Colville.

There are several other articles which we believe to be meritorious by virtue of the sound practical experience upon which they are based, but it will suffice to conclude by directing attention to the articles in the Finishing and Veneer departments. The foreman finisher may place absolute reliance upon the observations of Walter K. Schmidt, who contributes a special article, "The Chemist and the Manufacturer." Mr. Schmidt, who hails from Grand Rapids, and who is one of the recognized authorities on the use of various finishes, enjoins the foreman finisher to build up his experience with experimental work—a field in which we believe this journal should be of much service in publishing the results of experiments worked out according to certain receipts and formulae.

Mr. A. J. Mitchell indulges in a good straight talk on the care and handling of veneers, while an instructive article deals with waste in panel-making.

Value of the Trade Paper and Function of the Canadian Woodworker

UPON the occasion of an annual number, when advertiser and publisher alike exert a special effort in the direction of higher attainment, and when both devote valuable time and actual money in pursuit of this end, it is timely to give a passing thought to the function of The Canadian Woodworker in the important industry for which it caters.

First and foremost The Canadian Woodworker is designed to provide in its editorial pages the kind of good, practical articles which will be found valuable in everyday practice in the factory and make for better workmen and better products. At this stage of the development of the industry, when the facilities for technical education are so scant, this is a most important function—wherein, in fact, lies the raison d'etre of our very existence. Valuable as publicity is, and essential as is the use of printers' ink, the successful trade paper must be built on the solid and enduring foundation of reliable, educative matter. The aim of the Canadian Woodworker is to keep its readers posted on the latest information appertaining to methods, ideas, labor-saving devices and machinery, and we believe that this is reflected in the articles published in this issue and reviewed briefly in the preceding article. It is a significant fact—illuminating to both reader and publisher as to the opportunities ahead—that this journal is the only exclusively woodworking journal in a country whose constructional development has set up a new record in the world's history, and whose activities, taken in conjunction with vast timber resources, promise so much for the particular industry with which we are all identified.

We note with gratification an increasing disposition to send in letters giving ideas. We have heard the objection that many "ideas" are of doubtful value and likely to put a man on the wrong track, but this is a pessimistic, warped view. No institution, no community, no nation, ever has attained anything without giving the most active encouragement to ideas. The great country to the south of us is a conspicuous example of a nation which has encouraged ideas and thereby won industrial supremacy in many lines. And in the United States the trade paper is part and parcel of the machinery of development which has produced a nation that does things.

We in Canada believe that we have ideas, and we know that we have many problems appertaining to the woodworking and allied industries that are peculiar to our own country—notably the conservation, handling and storage of raw products, the introduction of new machinery and labor-saving devices, transportation matters, the protection of patents, the safeguarding of our interests with other countries in the matter of tariffs, and so on. We are a community, then, of ideas and problems. And herein is a definition for the Canadian Woodworker—may we sustain the part—a paper of ideas and problems. All the ideas in the world would be of little value without some means of disseminating them; moreover many of the ideas would not exist without this means. It is the publishing of ideas that generates others and in this way

The Canadian Woodworker becomes not only a source of information but a fount of inspiration. With the co-operation of the reader we feel confident of our ability to give the industry an editorial and advertising service of pre-eminent value.

Lastly, it may not be out of place to make a plea for the careful perusal of this journal. It is not sufficient to pick up a special or any other number and glance hurriedly through its pages and scan the "pictures" only. Ideas of value are never found on the surface. The surface must be scratched for them, and the man who has sufficient interest in himself and his calling must give his trade paper an intelligent reading. If he does not do this he is missing opportunities. As the intelligent and careful study of a good book has an educational value and becomes a pleasure to the reader in proportion to the benefit derived, so in the actual publication of this journal we, in turn, learn more of the woodworking industries and come to a better understanding of the problems which assail the woodworker in the shop.

We will stake the existence of The Canadian Woodworker on there being an opportunity or an idea in this issue for every one of our subscribers—but only an intelligent reading of the paper will disclose it and the fact must not be overlooked that the advertising as well as the editorial pages have a well-defined educational value.

Practical Hints on Kiln Drying

A source of annoyance to all woodworkers and users is the tendency of the material to shrink and swell with changes in atmospheric conditions. This is due to the fact that wood substance is hygroscopic—that is, it attracts or absorbs moisture from the air. Increase in the moisture content of fairly dry wood causes it to swell, and drying out causes it to shrink. This property of wood can be reduced, but not entirely eliminated, by subjecting wood to boiling, steaming, prolonged soaking, or exposure to high temperature. To determine just what effect kiln-drying has on the subsequent moisture condition of wood as compared with simple air-seasoning, a number of tests were conducted by the Forest Service in co-operation with the Yale Forest School. The test specimens were of two sizes, 2 x 2 x 6 inches and 2 x 1½ x 30 inches. Three sets seven pieces each were taken for each of three species, and for each of the different temperatures used. One set was simply air-dried and used as a check (C) with which to compare the other two sets of that series. Another set (A) was first air-dried for about a year, then kiln-dried, and finally placed aside with the check specimens to air for a year or more. The third set (B) of the series was soaked from the green condition for the same time that the other sets were air-dried, was then kiln-dried with the second set and placed in the aid with the others. The airing took place in the open under a shed on the north side of a building where they were protected from sun and rain. The comparative tests were all made at the same time which adds to the reliability of the results.

A comparison of the water content of the pieces that were kiln-dried first with that of the pieces that were only air-dried showed that in no case did the kiln-dried material absorb as much moisture as the other. For example, air-dried and water-soaked red oak blocks were kiln-dried at maximum temperatures of 145, 170, 212, and 274 degrees. They were then exposed to the air for a year or more and their average moisture content at the end of that time determined. The results were as follows: At 145 deg., previously air-dried (A), 7.6 per cent.; previously soaked (B), 9.6 per cent.; check specimen, air-dried only (C), 12.4 per cent. Similarly for the other temperatures the figures were: At 170 deg., (A) 10.6, (B) 10.6, (C) 12.4; at 212 deg., (A) 9.4, (B) 9.5, (C) 12.0; at 274 deg., (A) 8,9, (B) 9.9, (C) 12.6. From these figures, each of which is an average of seven tests, the reduction in hygroscopicity due to kiln-drying appears to be a permanent change by some fundamental change in the wood substance. The degree of dryness attained, when strength is of prime importance, should not exceed that at which the wood is likely to remain in use, but where reduction of the hygroscopic properties of wood are of first consideration it should be carried to as great a degree as possible and subsequently brought back to the condition under which the wood is to be used by exposure to the air for some time before the lumber is manufactured.

Cost of Boxes in Terms of Feetage

THERE is one really sound reason why cost and price should never be considered in connection with the wooden box, in terms of feetage, says Packages, editorially. Wooden boxes go on the market in competition with other containers. They should always be in just as good a position and possible to meet this competition. To be in this position the cost that is figured on it must be the exact cost and not an average or imaginary cost. Otherwise the manufacturer will find that in some cases his average cost will be a satisfactory basis on which to get the business while in other cases it will throw him entirely out of line. With exact cost figured on each size and style of box the manufacturer will be able to go out and get the business he is really entitled to, excepting, of course, for extraordinary conditions that no regular policy or plan would meet. Let's stop thinking of wooden boxes as so many feet of lumber. They are this to be sure, but also labor, nails, glue, printing, various other things and then **Service,** all of which give the box individuality and the right to be considered as a separate trade entity.

"Toona" Mahogany a Misnomer

"Toona Mahogany" is evidently a misnomer, comments a writer in a contemporary. It is not mahogany at all, unless you wish to call it Indian mahogany, which is about as accurate as calling a corncob pipe a Missouri meerschaum. The word "toon" is Hindustani, and describes one of the largest timber trees of India, occuring also in Australia, where it attains a height of 150 or 180 feet and a diameter of 5 to 7 feet. A traveller found one whose girth was 30 feet at five feet from the ground. The flowers are used for dyeing, and the bark is used to produce a kind of purplish leather, as it contains much tannin. The wood of the toon—don't pronounce it "tune"—is soft, durable, and easily worked. It is used extensively for house building in its native country, and of course for furniture and veneers. Veneers cut from the roots or from the trunks where large branches occur, are very beautiful. Most of the timber for use in this country is shipped through the English market, where it is known as "Maulmain cedar." The correct botanical name of the tree is Cedrela Toona.

Educational Facilities in Relation to the Future of the Woodworking Industry

Interesting Collection of Period Furniture at the Royal Ontario Museum

IT may be asserted safely that a future of immense possibilities lies ahead of the woodworking industry of this country, but at the same time the measure of our progress will depend largely upon the facilities placed at our disposal for technical training along the lines of other industrial countries, where through the advance of education and training this industry has developed into a science. The foundation forming the basis of a great educational movement has already been laid in Ontario, the great woodgrowing province of Canada, and in fact the birthplace of the industry. That the Provincial Government and the University of Toronto have interested themselves in this matter and have realized the prominent place which Canada should occupy as a woodworking country may be inferred from a visit to the Royal Ontario Museum of Archaeology, housed

The above illustrations are: (a) Chair used at coronation of Charles the Second. The elaborate carved work, including the crown, is one of the outstanding features. (b) Example of Italian chair, late fifteenth or early sixteenth century.

within the Royal Ontario Museum, Toronto. Here is to be found a collection of what in the near future it is hoped will become a creditable series of selections from the best styles of period furniture. The Museum, which is situated on Bloor street, west, is divided into four main parts of which the largest is the archaeological, and is used almost entirely for the benefit of the mechanics of the country. Other sections are devoted to natural history, geology and mineralogy. The section in which we are particularly interested at present, however, is the one in which it is intended to educate our woodworkers by placing within their reach the means of seeing some of the finest examples of furniture, the aim being to give them the ideas on which to develop for themselves and also for the country an industry which, adequately cultivated, should become the premier one, and make Canada the foremost woodworking country in the world. To ascertain how far we are behind other nations in this industry it is only necessary that we should look to European countries, Germany for example, whose prominent position as an industrial unit is due almost wholly to her excellent system of technical education. In Germany, as in England, extensive collections embracing the finest examples of period furniture are to be found carefully preserved not only in a few but in many museums. These collections have been gathered together for the benefit of the craftsman, the manufacturer, the dealer, and the private citizen. In this way the people of these countries have been brought into close contact with the finest examples and in this respect they have received government recognition and encouragement, theory and practice being made to go hand in hand, with the result that the woodworking industry of Germany and England has advanced to its present notable position. What European countries have achieved in the industrial field in the past Canada, by her unique position is eminently capable of doing, seeing that as a wood producer the Dominion possesses unlimited natural resources. If we are not favored with the valuable acquisition of examples of some of the rich treasures to be found in old English homes as aids to woodworking culture, at any rate we are looking forward to the possession of a representative collection of examples which will be stored in our museum for the benefit of the people. The nucleus of such a collection is at present to be found in the Toronto Museum which it is hoped will be open to the public early next year. The main object of the museum is to impart instruction by examples of really good-class styles of furniture so as to make better-class buyers and more highly trained workmen. It has been proven that given a proper chance Canadian workmen are equal to any other, and as ours is the finest wood-growing country in the world it only remains for us to provide the facilities by which the necessary training can be obtained. There is a great deal, for instance, to be learned from the French, English and Italian styles of furniture as specimens of their early period work show, but without living examples of such work the subject is a difficult one to teach. Little practical benefit can be gained from mere photographic reproductions. The collection at present in the museum comprises a number of rare examples of early furniture, prominent among which is a room of the Elizabethan period showing panelling and furnishings in their entirety. The panelling of the walls, for example, is one of the finest pieces of work imaginable. The panels are very thin notwithstanding which they are equal to much of the structural woodwork of today. This room, although it is practically three hundred years old, is in excellent state of preservation showing that both the wood and the workmanship of that period were of excellent quality, while at the same time the work is not by any means costly. In Canada today there is no desire for muddily furniture; the whole tendency appears to be in the direction of uniformity, which is a good thing in view of the fact that Canada is fast becoming a country of beautiful homes. Good furniture will be required to decorate these homes and considerable demand for this has already set in.

Not all people are looking for the costliest nor the

An Elizabethan room (1558-1603). The objects in this room, though not from one house, are all of the same date and might easily have been in one house. This room was taken from an Elizbethan residence in Norwich, Eng. The bed belonged to a house near Oxford where Elizebath herself once stayed. The harpsichord in the background is of Italian make and is probably one of the finest in existence. (From the R. S. Williams collection). Two chests (one of which is here shown) and two stools complete the furnishing of the room.

very finest product of the factories, but they comprise a sufficiently numerous class to be worth appealing to, and the manufacturer who sets high standards for himself will inevitably attract the kind of custom which goes with that sort of standard. It is sad that today so much good furniture is being purchased from abroad in view of the fact that, given sufficient scientific training and encouragement, our Canadian mechanic instead of being contented to manufacture only the cheaper kinds of furniture could reproduce excellent specimens of period and other furniture.

Amongst the examples of furniture which find a place in the museum are several unique specimens of chairs of Louis the Sixteenth period, possessing as

This beautiful work of art is a Spanish writing cabinet (open), made near Toledo about 1540.

Spanish writing cabinet (closed). The wood is plain walnut.

they do a dignified, graceful appearance which commends them both in point of quality and comparative inexpensiveness. Here, too, are to be found representative specimens of the Jacobean, French and Italian furniture, prominent amongst these being richly carved chests, in oak (one of the French fifteenth century style and another of the German fifteenth century period). These examples show the art of furniture-making at its best, notably that of a Spanish writing box or bureau of plain walnut which, though about three centuries old, is still in excellent preservation. The box is set on a rather elaborate stand, the idea being to balance the plainness of the box with the elaborateness of the stand. As a nation of woodworkers we have a lot to learn from the early Italian period, but not much from the modern, although there are signs of reversion to the styles of the early period. This is being done by collections in the museums in much the same way as Germany and England are doing and what Canada hopes to do provided she receives that national support which, as a rapidly developing country, is her due.

The aim of the museum is to instruct the present and future woodworkers of the country as to the origin of these specimens, the period to which they belonged, and as far as possible, their historical connection in order that they may gain a better and more profitable understanding of their work. One section of the museum is set apart for and occupied by an interesting collection of Chinese pottery beginning 500 B.C. and coming down to a century ago. It is the intention soon to establish a course of lectures for the benefit of mechanics showing how the different developments in crafts took place. The effect of this, it is hoped, will be to turn out a more intelligent and better trained mechanic, a worker whose chief interest will not centre around the pay day but rather in the quality and the technique of the work he produces.

There is an idea prevalent in some quarters that the styles of furniture are apt to change as frequently almost as the seasons, and on this account there is nothing to gain by investing in expensive samples of furniture. There is no such thing as furniture coming into and going out of fashion. Take some of the best houses in Europe for example (and we must take our copies of the best furniture from Europe because Europe set the style for America) people who value the artistic in woodwork are only too anxious to possess specimens of century or two century old furniture. If the work is really first-class, people become more attached to it as time goes on, and as a matter of fact examples of furniture are known to have remained in the possession of families for centuries. Only people who are fond of continual change would talk about getting tired of furniture in a few years.

In the museum there is a staff of specially trained woodworkers under the superintendence of Robert Ferguson and the style of museum fittings which they are making is a simple type, plain Canadian walnut being used very largely because of its harmonizing qualities with everything around it and its comparative cheapness. Wood carving is also encouraged at the museum and Mr. Currelly is anxious to obtain different types of joinings and some attractive dovetailing such as has been used in Italy. These specimens, needless to say, will be of incalculable value to technical students and others interested in wood carving. It is worthy of note that Mr. M. Langmuir has supplied the funds with which most of the present collection of chests has been obtained but it is sincerely hoped that national recognition of the industry will take place as early as possible and that the Government of Ontario and the Federal Government will subsidise it with special grants in connection with the vote for technical education. This would enable the museum authorities to procure samples of the best furniture obtainable. But if this is to be achieved action must be taken by the responsible authorities without delay as the best specimens of period furniture are being rapidly acquired by other countries. If this scheme can be carried out to the satisfaction of the museum it is the intention as far as the Province of Ontario is concerned to loan out collections of furniture and specimens of wood-carving to provincial towns such as Hamilton, Berlin, London, etc., and in this way to bring woodworking students in the industrial centres of Ontario into close touch with those examples of the best styles of furniture. This is precisely what European countries have been doing for years, therefore the people of this country will be justified in demanding the same finan-

This illustration is a South Italian table of the sixteenth century period which, though simple in design, is quite dignified. The chair shown on the same cut is of William and Mary period, and is probably of Dutch make.

cial support and encouragement from the government which the people of England and Germany have obtained. If this scheme of the museum materializes there is no reason why Canada should not in a decade or so become one of the foremost woodworking countries of the world.

Measurement of Shrinkage

IT is a matter of common observation that wood shrinks when it dries, but not equally in all directions. Shrinkage is due to the fact that while the cell walls grow thinner in drying they shorten imperceptibly. Other things being equal, the thicker the walls of the wood cells, the greater their shrinkage, but this applies only to different portions or specimens of the same species and cannot be used in comparing unrelated woods. For instance Osage orange is one of our hardest, heaviest and densest woods, yet its shrinkage in volume from a green to an oven dry condition is less than half that of some of the hickories.

If one takes an exact cube of green wood so cut that two of the faces represent cross-sections, two radial, and the other two tangential surfaces, and dries it out completely, he will find that while there has been little if any alteration in the length of the piece —that is, longitudinally or parallel with the fibers—the other dimensions have changed, the tangential shrinkage or in direction of the rings of growth being considerably greater than that along the radius—often twice as great. This is quite different from the behavior of a comparatively homogenous substance such as metal or concrete, and explains why shrinkage is so often followed by checking and splitting. Thus if one saws a complete section off the end of a green hardwood log and allows it to dry it will probably split to the center and in time a large V-shaped opening will appear. Upon subsequent soaking this cleft will close up. If shrinkage were uniform the section would merely grow smaller upon drying.

This question of shrinkage has a very important bearing on the use of wood. When squares are cut or staves made from green material it is necessary to allow for shrinkage, otherwise the final dimensions may be so small that the pieces will have to be culled. If wood once shrunk would remain in that condition one of the greatest ills of which wood is possessed would not exist. But the cell walls absorb water readily not only in liquid form but also from the air. Wood dried at high temperature "works" less than air-dried material, even after it is brought back to an air-dry condition. No matter to what degree of dryness wood may be brought in the kiln it is important that at the time of manufacture is should contain approximately the amount of moisture it will normally have in use.

The United States Forest Service has made a great many shrinkage measurements in connection with the tests on the strength values of woods. The results obtained are for use as average working values rather than the basis for detailed study of the principles involved. A common method of making the tests is to take from each bolt two specimens one inch thick, four inches wide and one inch long. They are taken close together so that the results from the two will be comparable. One of the specimens is cut with its width in the radial direcion and is used for the determination of radial shrinkage. The other has its width in the tangential direction and is used for tangential shrinkage. The specimens are carefully weighed and measured while in a green condition; they are then air-dried and afterward oven-dried at a temperature of 212 degrees F., until a constant weight is obtained, when they are again weighed and measured.

To determine the shrinkage in volume the test specimens are submerged in water both before and after drying. The exact amount of water displaced by the blocks is measured, and corresponds to the volumes of the material. In the following table the results of the measurements on twenty hardwoods are given, the species being arranged in the order of their volumetric shrinkage beginning with the greatest.

Shrinkage in Volume of Twenty Hardwoods from Green to Oven-Dry Condition

	Volume, per cent.	Radial shrinkage, per cent.	Tangential shrinkage per cent.
1. Big shellbark hickory (Hicoria laciniosa)	18.3	7.7	13.2
2. Pignut hickory (H. glabra)	18.2	7.2	11.6
3. Mockernut hickory (H. alba)	17.7	7.7	10.9
4. Swamp white oak (Quercus platanoides)	17.7	5.5	10.6
5. Yellow birch (Betula lutea)	17.0	7.9	9.0
6. Shagbark hickory (Hicoria ovata)	17.0	7.2	10.6
7. Beech (Fagus americana)	16.5	4.6	10.5
8. Post oak (Quercus minor)	16.0	5.7	10.6
9. Slippery elm (Ulmus pubescens)	15.5	5.1	9.9
10. Black oak (Quercus velutina)	15.1	4.7	9.5
11. White oak (Quercus alba)	15.4	5.3	8.8
12. Basswood (Tilia americana)	14.5	6.2	8.4
13. Sugar maple (Acer saccharum)	14.3	4.9	9.1
14. Hackberry (Celtis occidentalis)	14.0	4.2	8.9
15. Red oak (Quercus rubra)	13.8	4.0	8.3
16. Sycamore (Platanus occidentalis)	13.5	5.0	7.3
17. White ash (Fraxinus americana)	12.6	4.3	6.4
18. Tupelo (Nyssa aquatica)	12.4	4.4	7.9
19. Osage orange (Toxylon pomiferum)	8.9	——	——
20. Honey locust (Gleditsia triacanthos)	8.6	——	——

Printing Trade-Marks on Wooden Boxes

THE following information relative to the printing of trade-marks on wooden boxes is given by a contemporary in reply to an inquiry from a Nova Scotia firm:—There are several makes of wood-printing machines. Of the two classes, one uses curved plates of brass, and the other is a platen press similar to a job-printing press for paper, but heavily constructed and known to the box trade as a "flat" press. These were formerly used for type work but have been largely replaced by curved type held in an adjustable holder and used as a plate on the cylinder press. The adjustable cylinder form of machine and curved type are patented and most boxe factories have one or more sets. Cylinder presses can be obtained to print two or three colors at one operation, it only being a matter of one cylinder and one fountain for each color desired. Of course these printing machines are not to be confused with presses for embossing wood, although embossing can be done on soft woods with a cylinder press to one-eighth of an inch deep, but it is not good practice.

One of the largest London firms in the box shook trade who, among other connections, do a big business in India and Ceylon with users of tea chests, state that Canadian poplar is well suited for this purpose. While veneer chests are preferable where a long transportation is necessary, many of the growers possessing easier shipping facilities use ordinary boxes manufactured largely from Baltic woods, but owing to the pervading smell of the Swedish fir and the occasional presence of gum, this variety of timber is far from suitable for the purpose. For this reason it is thought that poplar wood free from such disadvantages, is in many respects an ideal material for the construction of tea chests.

The Woodstock Factories of The Canada Furniture Manufacturers, Limited

Twentieth Century Practice in Construction, Facilities, Methods and Equipment

By W. J. Beattie

BEFORE entering upon a discussion of the Woodstock plant of the Canada Furniture Manufacturers, Ltd., it may be well to present a few facts with a view to conveying to readers of The Canadian Woodworker an idea of the capacity and dimensions of this industry. The factory has a frontage of 500 feet on Mill Street, a total area of 237,300 square feet floor space, a power plant of 500 steam generated in addition to 140 Hydro-electric h.p. The dry kilns have an annual capacity of 4,750,000 feet of lumber. The area of the factory site is twenty-five acres. There are seven-eighths of a mile of switching tracks on the company's property, and eight cars can be loaded at one time. Fire protection on the most up-to-date lines has been installed at a cost of $25,000.

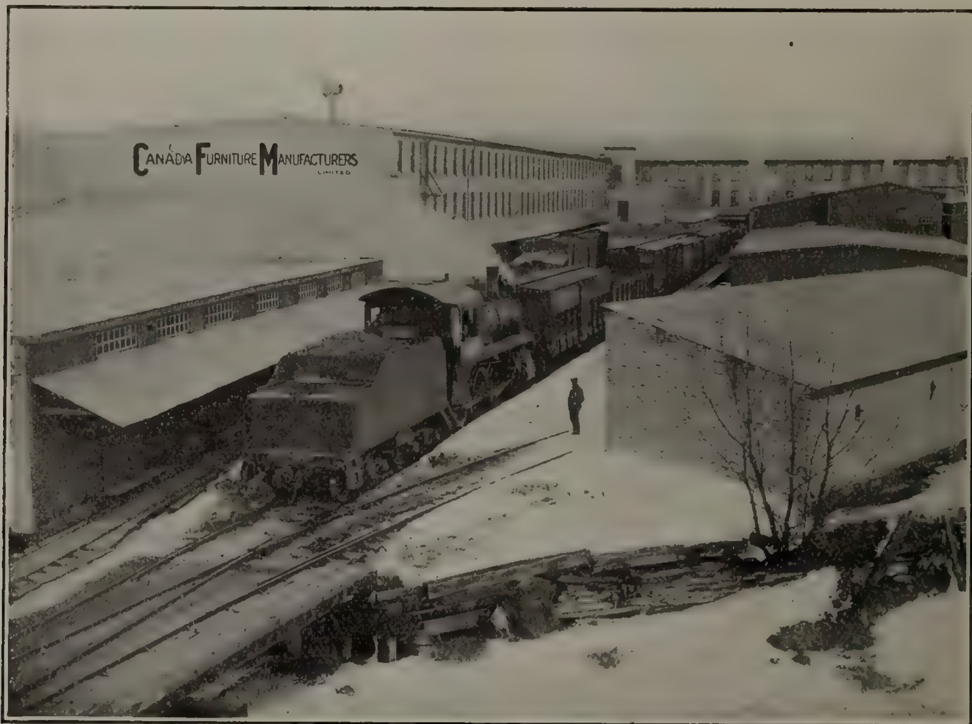
This plant is in reality three factories in one, comprising a chair factory facing on Mill Street east, the south wing which is a four-storey building (the cut shows three) being a case goods factory, 200 ft. long by 60 ft. wide, where medium-priced dining, bedroom and hall furniture is produced. The third factory, which is completely detached showing at the top of the cut (west), is an electrically driven plant manufacturing quartered oak dining room, hall and library furniture.

The north wing is devoted to storage and shipping rooms, with the exception of a portion of the top floor which is used for varnishing and rubbing rooms. This wing is 300 ft. long by 70 ft. wide.

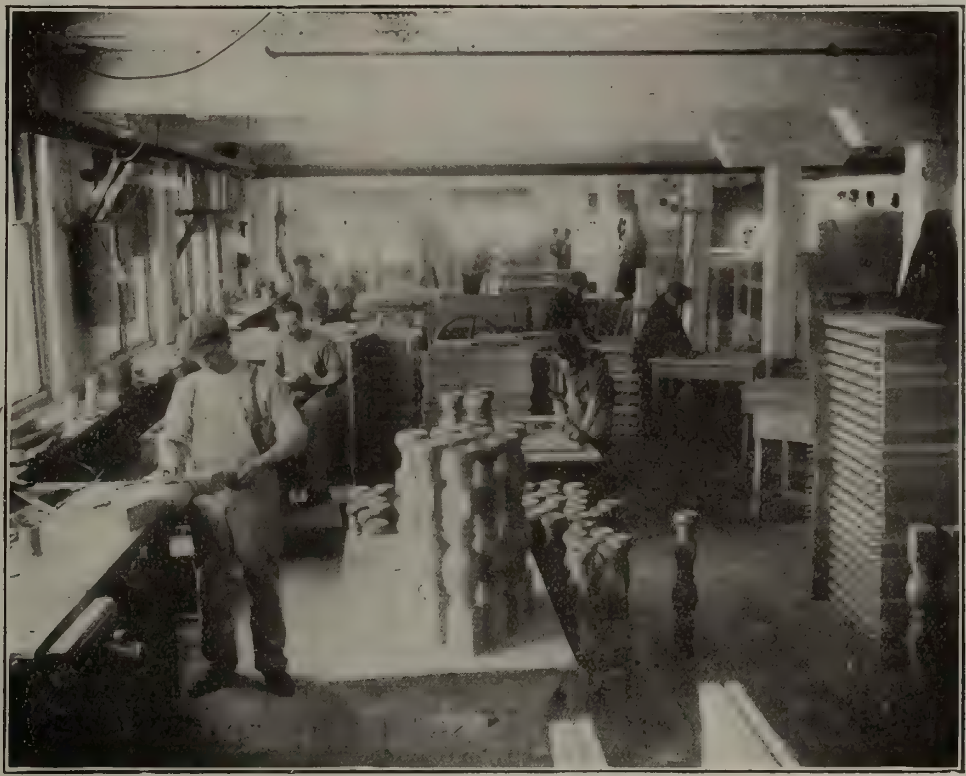
The lumber yard is well stocked with all sizes and kinds of foreign and domestic lumber, the quantity carried running from 1,500,000 to 2,000,000 feet. The domestic lumber comprises practically every kind used in the manufacture of furniture, the foreign being quartered oak, mahogany and red and sap gum. The railroad switches run through the lumber yard, making the unloading of cars as handy as possible.

The dry kilns, which are from the Grand Rapids Veneer Works, Grand Rapids, Mich., are the most up-to-date possible to procure. They are of the "progressive" type (that differ from the individual box kiln) and are the best for manufacturers who cut large quantities of one thickness of material. These kilns are most substantially built of hollow tile and brick, having a reinforced tile and concrete roof, the walls running up about two feet above the roof, which latter is pitched towards drain pipes connected with underground pipes that carry the water to the sewer or other outlet. The larger kilns are usually divided into compartments two tracks wide by a wall of hollow tile through which the ventilating flues run. These are controlled by automatic dampers. The basement of the kiln is excavated three or four feet and floored with concrete, just like a cellar.

At each end of the kiln there is constructed an "operating" pit. This extends the full width of the kiln, having a concrete wall to protect it. It is from these pits that the flow of steam and the regulating of valves and dampers is done. The advantage of being able to do this without having to open the kiln doors, is quite apparent. The kiln is equipped with steel girders on to which the rails are fastened and under which the steam heated pipes are suspended. These



Partial view of factories and yards, showing shipping facilities.



Portion of bench room, cabinet department.

Part of the turning department.

girders are laid so as to give the track a gentle grade towards the discharging end, making the progressive moving of cars a very easy matter. At the receiving end is the steaming chamber, which is accomplished by the dropping of a heavy duck curtain, in much the same way as a theatre curtain, only that it can be done from the door of the kiln. In the basement a concrete wall is built up to the car tracks, on to which the curtain roller falls (the wall being slightly hollowed to receive it), thus making a closed chamber, into which live steam is let through a pipe having a number of perforations. This pipe is directly under the car and the steam thoroughly permeates the lumber, the effect producing complete saturation, expanding the lumber, opening the pores and sap cells and dissolving their contents. Even though lumber may be warped, twisted, and surface checked or to some extent casehardened by the action of the weather before entering the kiln, when taken from the kiln it will be flat, soft (even knots and swirls work as easily as clear stock), whilst surface checks close up. It is impossible to caseharden lumber by this process, therefore checking and honeycombing is unknown, resulting in prevention of waste of both labor and material.

Lumber so treated and expanded will retain its measurements independently of atmospheric changes. The advantages of this will be apparent to every woodworker who has had the pleasure (?) of seeing his tops and panels split in centre or open at ends, with raised grain, or surface defects due to defective drying.

Lumber of one-inch thickness is steamed for twenty-four hours, the curtain is then raised and the car is pushed to the other side. It is now thoroughly saturated and the application of dry heat at a high temperature would caseharden and ruin it, but this has all been taken into consideration and by the automatic control by dampers the percentage of humidity in the air is kept at such a point that no trouble ensues, and as the lumber moves forward the percentage of humidity becomes gradually less, until the last stage of 160 degrees of heat contains the same relative proportions of humidity as will be found in an ordinary living room.

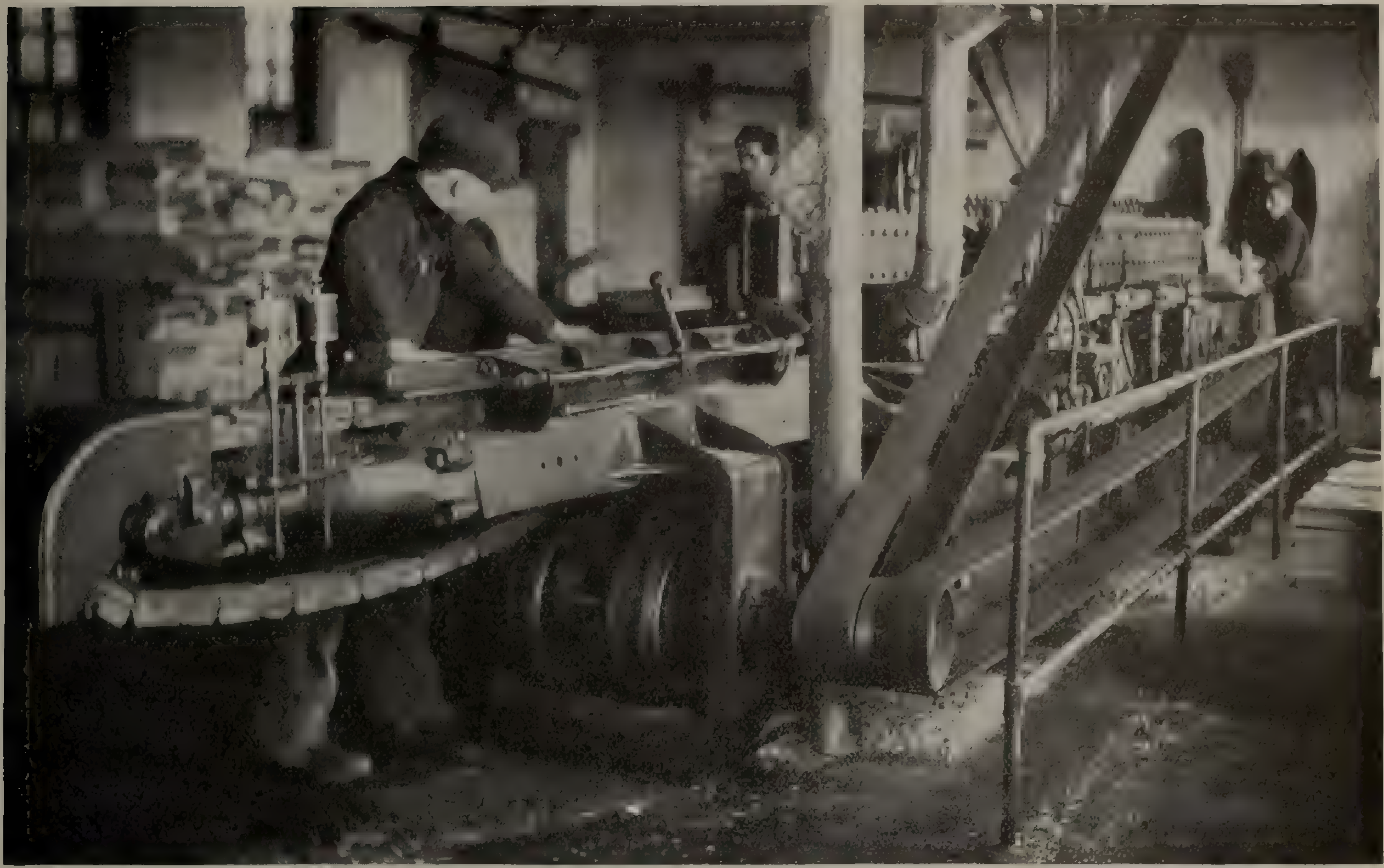
The thermometers used in these kilns are generally the Bristol self-registering. These give you the temperature on a dial attached to a clock, every hour of the twenty-four, a dial lasting seven days with one winding of the clock.

The kiln walls have small openings at the proper distances, which have double metal-hinged sashes through which by means of an hygrometer the percentage of humidity inside the kiln can be easily ascertained.

The kiln as described has no wood whatever in its construction, except the doors which are constructed on, and operated by the Indianapolis door-carrier system, making it easy for one man to lift and swing the door clear to run on the suspended tracks across the ends of the kilns.

The lumber having been discharged from the kiln is run into a cooling shed which has been built in line with the kiln and in some substantial manner, having the tracks laid on steel girders, cement foundation, brick walls, and heated during cold weather to seventy

A portion of the machine floor in the cabinet shop.



Linderman jointing machine.

degrees, so that when the lumber is delivered to the factory it is in proper condition to work. It might appear to the reader that the running of such kiln is rather beyond the average man, but such is not so. Once the dampers on the ventilating ducts are regulated properly and the directions followed, there is no cause for anxiety.

The average time to dry inch oak that has been fairly air seasoned is ten days, although this can be achieved in seven days when desired. It can be readily seen that with such a modern kiln the amount of capital sunk in a lumber yard can be decreased to such an extent that the cost of the kiln is a good investment.

The motive power of this plant consists of two high-speed Peerless self-oiling engines made by Leonard & Sons, of London, Ont.—one of 275 h.p. and the other 225 h.p. Steam is supplied by a battery of five boilers, four of which are used, thus allowing each individual boiler to have one week in every four for cleaning and any necessary repairs. The boilers were made by Whitelaw & Sons, of Woodstock.

The factory in which the quartered oak case goods are made is driven by Westinghouse electric motors, four of which are used. These motors are all suspended from the ceiling so that no floor space is taken up. Three are connected to different line shafts and the fourth drives a double shaving exhaust fan.

Power transmission is by belt and rope drive. The latter in one instance is used to transmit power from one building to another, but in case where the two shafts are not parallel and could not be made so on account of the buildings, the rope drive easily overcomes a difficulty of this kind where a belt would be impractical. This equipment was furnished by the Dodge Pulley Company.

All the shafting installed is the Chapman double ball-bearing, which has been found to save a lot in power expense. One babbit-bearing shaft having seventeen bearings 120 ft. long was replaced by a Chapman, with this result. This shaft was motor driven, the weight of shaft and pulleys being known. The babbit bearing shaft turning three hundred revolutions per minute, took nearly eleven horse-power. When the ball-bearing shaft was installed, having the same pulleys on, it took very slightly over four horse-power; figure out the saving yourself.

There is one thing to be watched in connection with ball-bearing shafting and that is to see that the adjustments are looked after very carefully for the first few weeks after installation.

They only need lubricating twice a year. All the pulleys used are the Dodge split type. These have the sides covered with heavy paper board so that no dust can lodge in the arms, and besides the danger of accident is eliminated.

Most of the exhaust fans used are from Sheldons, Limited, of Galt. the last two installed being 50 in. single, slow speed. These fans revolve only 900 r.p.m., but on account of new ideas in construction are more effective at less power cost than the high speed fans formerly in use. The use of the air compressor for removing dust from the walls and ceiling and from machines is a decided step forward in keeping the factory clean. This is also used for keeping the electric motors as clean as possible. A small pipe is run from the compressor, out of which are branches. Valves are placed a few inches from the ends, which are threaded to receive an ordinary garden hose of suitable length provided with a long nozzle having a small opening about 3-16 in. in diameter. This is a most effective way to "clean up."

In connection with the plant is a well equipped

machine shop, in charge of a competent machinist and assistants. This department is equipped with the necessary iron working machines, such as lathes, planers, drills, etc. In this department are also placed the saw filing, knife grinding and knife making machines; and the band re-saws are all tensioned by machine-driven rolls and not hammered in the old way. It is of interest to note that every machine in the factory using saws or knives, has a double equipment so that their is no waiting, sharp tools being always ready for exchange.

Of the 400 machines used in this plant space forbids of reference to any but the most recent ones installed. Self-feed rip saws are now almost exclusively used, made by the Canada Machinery Corporation, of Galt; and Ballantyne, of Preston. These give every satisfaction, the manual labor required to operate them being but a fraction of the old hand-feed method.

The machine-feed buzz planer is now a fixture in the factory, several of these being used. Everything that comes from the rip saws is run through them before going to the stickers or planers, thereby ensuring good true stock. These machines are from Jackson, Cochrane & Company, of Berlin, Ont.

Of the several different glue jointers used, one is an endless feed machine made by the Canada Machinery Corporation, Galt. A double-tongue joint is used on most work. This machine has given entire satisfaction as successor to the old style "forward and back" jointer.

Another jointer used is the Linderman made by the Canadian Linderman Company, Woodstock, Ont., being a branch of the parent plant in Muskegon, Mich. This machine is one of the most advanced in woodworking machines. The material after leaving the rip saws goes straight to the jointer, and jointed one piece after another until it is wide enough to be run through the self-feed saw in connection therewith. The piece that is ripped off is returned to the "first" end and becomes part of the next in rotation so that waste is reduced to a minimum. The principle of a dovetailed joint is one that appeals to a mechanic and when that is made tapering the mechanical perfection is complete.

The amount of taper is exactly the same in a joint six feet long as in one of twelve inches. The glue is delivered to the oint by a revolving brush which effects a saving in glue of not less than forty per cent. There are of course no clamps in connection with the glueing. The material after being glued together is piled on trucks and sent forward to the next process. For resawn stock, cutters, making two dovetails, are used, so that each piece has a dovetail in the centre. Cutters are made for all kinds of work, including bevelled joints, such as are needed on table columns. The joint is first bevelled on a sticker, then dovetailed by the Linderman and is glued and pushed together by hand, no clamping being necessary.

This machine is made in various lengths. The smallest ones for jointing three or four foot stock, the larger ones up to sixteen feet in length, though they can be made for any length desired.

The Canada Furniture Manufacturers' were among the first to adopt this jointer and visitors to Woodstock who are interested are always taken to this factory to see the machine in operation, by the Linderman Company.

Two fine 10-in. four-sided stickers by the Hermance Machine Company, of Williamsport, Pa., are amongst the recent installations. These machines are very strongly and rigidly built, having many improvements in the way of making quick changes. The work turn-

A glimpse of the finishing department.

One of the enamelling rooms.

ed out is perfect, the mouldings being as smooth as can be made on a good shaper. In connection with these machines are kept the different kinds of knives and groovers already attached to the heads, in a cabinet, handy to the operator, so that changes are made in the minimum of time. There are variable speeds of feed that can be changed at will, according to the stock being fed through.

Several different kinds of planers are used, from the fast revolving bed pattern that feeds stock through at 70 or 80 ft. per minute to the double surfacer dressing both sides at one operation. These machines are by the Fay & Egan Company, of Cincinnati. There are five or six shapers used, all by McGregor, Gourlay & Company, of Galt (with one exception which is a Whitney), Triple drum sanders by Fay & Egan Company, McGregor, Gourlay & Company, and a Columbia from Green Bay, Wis.

Hand and belt sanders of every known style and for every kind of work have been installed. There is simply no kind of woodwork made in a furniture factory that can not be sanded well, in this plant, if the machines have not the proper appliances to do some of the work necessary, they simply make them. In connection with the sanding of case and table tops it is well to remark that to avoid the hollows that show along joints in finished furniture, they are piled on strips after they have left the triple drum sander, until a few days before the cabinet makers need them, which is sometimes two or three weeks. The moisture in the wood from the glue which evaporates slowly has then dried out, and the belt sander levels the whole surface like a piece of plate glass in which condition it remains.

A Nash machine in the chair factory cuts off and chucks both ends of spindles and dumps them into a receptacle to be wheeled away. A seat hollower is being installed by which chair seats are hollowed or saddled and fed like a planer, this operation being about ten times the speed of the old method. A Nash sanding machine sands all round straight stock.

A glueing machine glues all dowel holes and drives the dowels into them, which is a great labor saver. In the department where the chair turning and bending are done the machines used are all up-to-date. Gang rip-saws are used, and hydraulic bending presses by McKnight installed.

A veneer department in connection with this part of the plant is equipped with a veneer machine, sizer and dryer, glue spreader, and power press. Glue, that vital necessity in a furniture factory, is made fresh daily, being heated in an up-to-date boiler having a revolving agitator. The warm glue is run off into oblong tanks about 4 ft. long, 8 in. wide and 4 in. deep. When it has jellied, it is cut into convenient sizes and delivered to the many users throughout the factory. This has been found to be the most satisfactory way of insuring thoroughly fresh glue. More glue is spoiled by overheating than by any other cause. It should never be heated hotter than enough to make it run freely, from 140 to 150 degrees. The old idea of boiling glue and having the stock to be glued so hot that it could not be handled with bare hands, has been exploded long ago, but some of the older men in factories still cling to the idea of heat and lots of it. The glue used in this plant is Cannon's, two grades, one for veneering, a slow setting glue, and the other for jointing. The most satisfactory material yet found for veneer room cauls is aluminum, being light and standing the great pressure of power presses well.

The more recent elevators installed are by the Otis-Fensom Company having all the up-to-date safety appliances possible.

The finishing rooms are equipped with every facility for doing good work. All goods that can be varnished by the dipping process are done that way. The fumed finish, now so popular and durable, is done by the box fuming process. This is superior both in color and quality to brush fuming, as the color goes into the wood some distance and is not altogether on the surface.

White enamel furniture is one of this plant's specialties. They use an enamel that will not turn yellow and have built up such a trade that they find some difficulty at times in keeping up with orders.

Gum wood is now a recognized furniture wood and many beautiful suites are here made out of this material. The Adam style looks particularly well in gumwood. Quartered oak is still one of the favorite woods and looks particularly fine in designs in fumed oak. The Golden oak color still holds its own; early English is on the decline. Mahogany, the queen of all cabinet woods, is finished in natural, stained and antique. The pneumatic rubbing machines used in the rubbing rooms of the case goods factories are great savers of what is, perhaps, the hardest work in a furniture factory.

These machines are supplied by air pumped into a

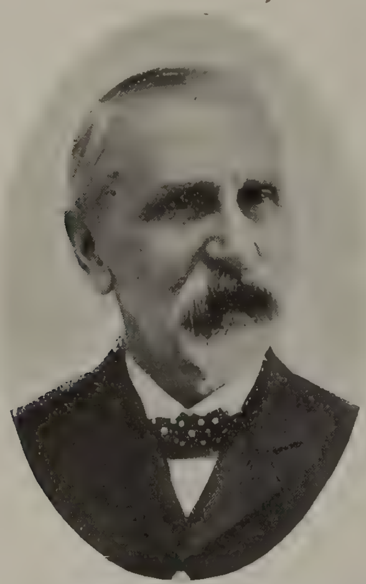
A corner of the engine room.

reservoir from which it is piped to where it is needed. Over the heads of the operators a hose is attached from this pipe to the rubbing blocks. This attachment consists of a metal cylinder about 10 in. long and 3½ in. in diameter, under which are two felt blocks. When air enters the cylinder it causes the blocks to oscillate in opposite directions in short and rapid strokes (on somewhat the same principle as a steam engine works). Although this tool weighs twenty or twenty-five pounds, when the air is introduced, it is moved around on the work with the greatest ease.

Before the machine is started the operator sprinkles pumic stone and water or oil (as the case may be) over the surface and then goes to work. The tool being directly under his control can be stopped and started instantly.

The air compressor is worked at about ninety pounds pressure. As soon as that is lowered, the pump automatically begins forcing air into the reservoir. The pump is manufactured by the Curtis Company, of St. Louis, the pneumatic rubbers by the Rockford Pneumatic Tool Company.

The shipping facilities at this factory are certainly not excelled in Canada, an assertion which is backed up by the fact of the main line of the C. P. R. running



Mr. J. G. McBeath, manager of the Woodstock factories of the Canada Furniture Manufacturers, Limited.

between Montreal and Chicago, and the double-track main line of the G. T. R. and branches of both roads running in every direction. Woodstock is the principal carload point for C.F.M. shipments.

In the protection of the plant from the arch-enemy fire, every known device has been employed. The whole plant is thoroughly piped and fitted with Grinnell sprinkler heads. The factory buildings are "wet" continuously; that is, the pipes are kept filled at an eighty or ninety-pound pressure. Any departments that are not kept heated to a certain temperature durcold weather, are on the "dry" system. For instance the freight enclosure building would not be a practical proposition from a heating standpoint, in very cold weather. If a fire occurs in such a building, air rushes out of the pipes and water automatically follows.

This system avoids any danger of pipes freezing in such buildings. The company has private water mains throughout their yards, having hydrants and hose houses at every convenient point. These are all connected with the city waterworks. But to make assurance doubly sure they have dammed Cedar Creek, that runs through their property, and have installed an electric pump that starts automatically, should the city pressure go below a certain point.

The reservoir, caused by the dam holds 200,000 gallons of water and is fed by a never-failing stream which drains several lakes immediately above on city property. The electric pump, which is driven by a 100 h.p. motor has a capacity of 1,000 gals. per minute under 100 lbs. pressure. This equipment is in the fire hall (shown in the left corner of the cut) in which six men are kept on night duty, also when the factory is not running.

The sprinkler system was installed by the General Fire Extinguisher Company, of Toronto, and the electric pump by the Storey Pump & Equipment Company, of Baldwinsville, N.Y. When you add to the foregoing the chemical hand fire-extinguishers throughout the factory, this plant can surely challenge comparison.

The manager of the company is Mr. John G. McBeath, one of the deans of the Canadian furniture manufacturing world, who is also mayor of the city of Woodstock.

Utilization of Waste

FROM time to time discussions have appeared in the Canadian Woodworker on the problem of the waste pile as a money maker for the manufacturer. A few reflections on this subject appeared in a recent issue of Barrel and Box, and we reproduce the article in part for the information of our readers.

A bunch of baled cuttings may produce material for an A1 box at a minimum price, but when box plants get in competition with each other and pay extraordinary prices for cuttings, they generally find the available lumber so scant in quantity as well as thickness that they could better have bought a pile or two of No. 3, No. 4 or No. 5 boards and cut them up regularly. On the other hand, when the sawmill is not cutting, edging and re-sawing the timber as closely as possible there is a chance for a pick-up for the boxman, at least until some buyer comes along who does not know the real value of the material, or the labor cost of handling it, and is not aware how much the odd-shaped stuff adds to the cost of box shooks.

This is a day of economical methods in the utilization of raw materials. There soon must be an adjustment along the line of minimum efficiency for the wage scale as well as a balancing of the waste account. It is necessary to know how small the amount of real cuttings you are getting out of the sawmill refuse pile. Since it has become fashionable to utilize almost any kind of material in making boxes, the waste has diminished in the cutting of some stock, but in a number of the new materials used, the waste is greater than it was when the box was made strictly of the old white pine board which cuts like cheese, although it might be full of knots; or when you were cutting your packages out of scoots where red horse cantered all over the board.

The utilization of waste often makes a poorer package, unless it be shorts which are really better than waste. The package must be built nowadays to carry the goods. If the sawyer's ticket indicates lengths and widths on box lumber, the same as it does on sash and door material, or other high-priced pro-

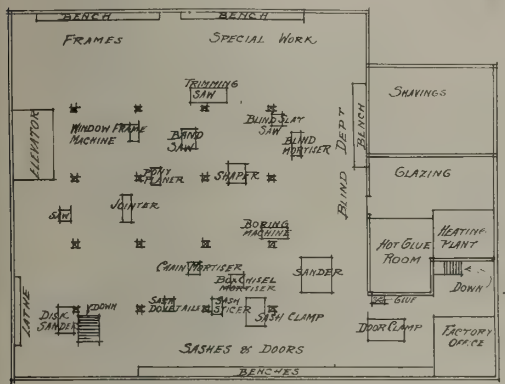
duct of the log, it might adjust the waste problem. But as a rule lumbermen do the cutting from better grades, and the only regulations that apply to low grade stuff are on the cutting table made for better grades. Therefore it would be sound on width and thickness but would depend on the shape of the log as to length, and as to how many defects are registered on the board. Another point affecting the waste problem is the outside competition from a territory like the Pacific Coast or the Inland Empire, which shows better widths. These competitors are getting much better material, and are often getting it at the mill; consequently it forces small utilization of materials competing with them. In fact, some of these new found friends of the trade, owing to their pleasant surroundings, are able to furnish better widths and less defective material and, therefore, put the waste material at a disadvantage.

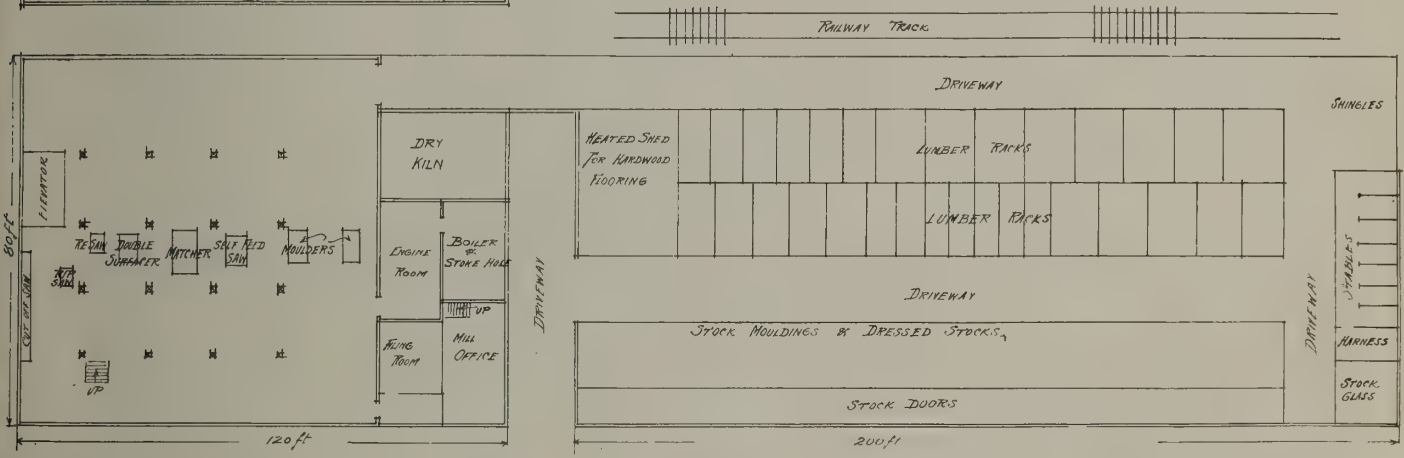
In summing up the whole proposition of waste material it may be stated that, owing to the necessity for utilizing the tree in all its parts, we must use the low grade and waste material. Unless some plan is devised to manufacture that stock so that it will fit in with contracts in force, or with a particular trade, it will cause the box manufacturer, even if operating his own bolt mill, to absorb his profits in caring for the waste from his purchases. A substantial sound-knotted box of some standard quality, no matter what grade it is being made from, must be the leader of the future. The fact that there are more mills being operated nowadays adjacent to the sawmill, makes it more desirable for the box factory to have that connection so that more care can be used in the selection of a material to make a standard package.

Look carefully after the adjustment of the guides on the shop band saw. A guide may do lots of good or lots of harm, depending on how it is used.

Waste Product Used as Fuel in Up-to-Date Ottawa Factory

HEREWITH we reproduce a sketch showing the layout of the new factory building, with the several machines and the adjoining lumber shed of Messrs. McAuliffe, Davis Lumber Company, Limited, Ottawa. Early last March fire broke out at one of the company's yards and destroyed the entire factory equipment, with all the machinery and dry kilns. This was a severe blow at the beginning of the busy season. The company's difficulties were considerably lessened, however, by the fact that they possessed other mills and so they set to work at once to reconstruct the building which had been destroyed and accomplished this by the first of October. They have since been running to full capacity. The new plant is very complete as a retail unit and it possesses a number of points of interest among which may be mentioned the fact that shavings and sawdust made in the machining of the lumber are utilized as fuel in providing steam power for the operation of the plant. Among the company's lines are pine, spruce and hardwood, with sash, doors and mouldings, and a specialty of milling. Operations are carried on in an extensive manner with wholesale, retail and factory departments. The company have five yards in the city, three of which are replete with planing mill equipment and the usual machinery, including planers and matchers, moulders, rip-saws and re-saws. At the fourth yard there are only rip-saws, which are used for sizing lumber sold from that point. The fifth yard is used as a storage for lumber which has been run through one of the company's planing mills.





Lay-out of the new plant of McAuliffe, Davis Lumber Company, Limited, Ottawa.

In rebuilding their factory, the company profited by past experience providing a solid concrete floor and brick walls, the upper floor being of mill construction. The heaviest machines, including the matcher, moulder and saws, have been placed upon the main floor and the lighter factory machines upstairs. All the machinery is of the latest type and was furnished by the Berlin Machine Works, the A. R. Williams Machinery Company and the American Woodworking Company. The cost of the equipment installed was some $22,000, about the cost of the new building.

Railroad sidings adjoin the company's property and cars are unloaded without rehandling by the use of rollers. Hardwood flooring is stored in a heated wareroom to ensure a satisfactory condition when leaving the plant.

An Economical Plant for the Manufacture of Wooden Boxes

By Harold V. Coes

IN preparing plans for a new plant of any character, many factors must be considered to insure economical operation and production. Since improvements are constantly being made in equipment which make it exceedingly difficult to keep even a new plant entirely up-to-date for an extended period, it is essential that all the latest and best ideas be embodied.

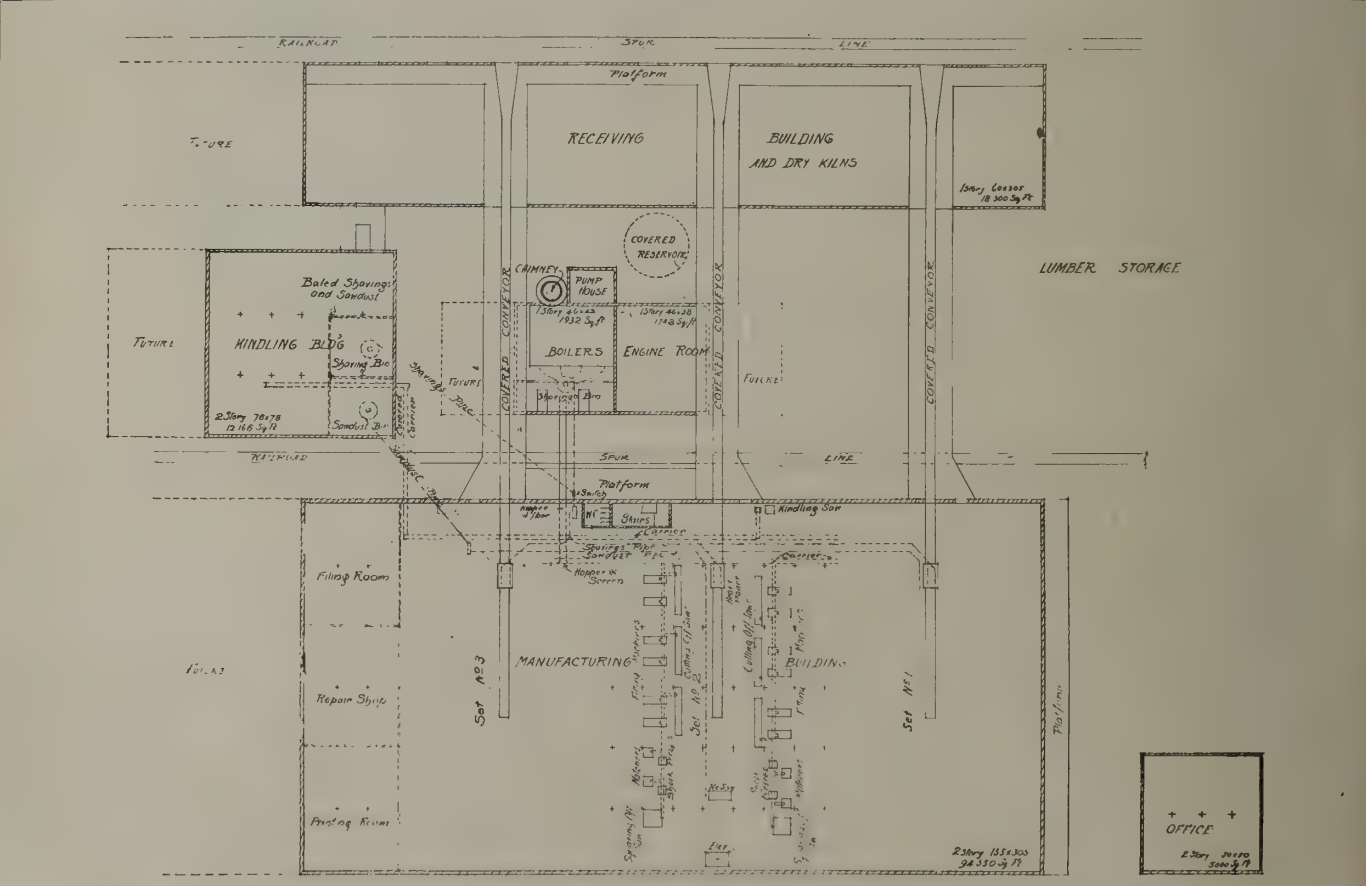
The feature of primary importance, however, is the arrangement of the departments in such a manner that the product in its conversion from the raw to the finished state shall pass through the various operations with the least amount of handling; in brief, it is necessary to build the plant round the process rather than to install the machines to fit the plant. Unfortunately, this ideal method of attacking the problem is not always practicable, for the reason that engineers frequently have to design buildings for a particular plant to fit the site, the ideal method, of course, being to design the plant to suit the conditions of manufacture and then to purchase the piece of property which most nearly complies with all the conditions imposed by the plant.

General Principles.—Where the ideal method can be employed or where the property is not badly cut up or very irregular in shape so as to impose undesirable conditions on the plant, a number of ideal plant studies should be made regardless of the confines of the property, all of which should embody the following features:—

1. Minimum transportation of material from the raw state to the finished state.
2. Proper relationship of all buildings with regard to the plant as a whole.
3. The principle of unity for future extensions. (If a layout were determined which would meet the requirements for the present and in which the departments were all properly located with respect to ideal routing for raw material and finished product, then future extensions and addition must likewise preserve the same relationship.)
4. The development of the entire property economically to its ultimate capacity.
5. The maximum of light and sufficient ventilation.
6. The design of that portion of the plant which it is necessary to build immediately to house the present business.

The writer's experience in his practice with Lockwood, Greene & Company in the design of plants for various industries has attested the soundness of the above principles.

A Typical Plant.—It can readily be seen from studying the block plan of the plant considered in this article, that the layout conforms with the recognized



Typical lay-out of an economical box plant.

principles enumerated above and that future extension of any one of the several buildings will not necessitate re-arrangement of the plant or departments or of sequence of operations, except perhaps in a few isolated cases. The plant under consideration, we have assumed, manufactures a range of boxes which may be grouped in three classes; that is, any one of the styles of box or packing case made will fall into one of three groups. This does not mean that all box factories must have their machinery laid out in this manner, but it does mean that in the plant which we are considering, owing to the varied line manufactured, the machinery works out best for economical production if divided into three groups, each with a different range of sizes.

The board stock comes in by the railroad siding to the receiving building where it is taken directly from the cars and unless previously dried it must go into the board kilns. From the receiving building, which includes the dry kilns, run three conveyors which go to the second floor of the manufacturing building, carrying the raw material to the three groups of machines mentioned above. From the conveyor, the stock goes through the heavy planers, then divides, one half of it going to the group of machines on one side, the other half to the group of machines on the other side, which include, in the case of a plant using round-edged boards, cutting-off saws, fitting machines, matchers, shook presses, resaws and squaring-off saws.

On this floor space is available for any extra operations on higher grade work such as edge planing or sanding. A corner of the building may be devoted to printing, where the partition enclosing filing room and repair shop may be extended without cutting up the main floor space. Opposite the conveyor aisle are the elevators which take the finished product to the floor below where the cases, if to be nailed, are assembled, put through the automatic nailing machines and sent to the shipping department. Machines for making lock corner boxes may also be located on the lower floor.

Utilizing the Waste.—The handling of the sawdust and waste pieces also deserves attention, for besides their value as fuel, they may be sold to advantage if the plant is near a city. Under each machine is a hopper through which the waste material drops onto a conveyor or into a pipe. Screens are provided in the case of the saws to separate the sawdust from the end clippings. The sawdust is blown to a bin in the kindling building where it is baled and shipped away on cars or teams. The end clippings drop onto a carrier belt which conveys them to a bin overhead in the boiler house where they are used for fuel.

For collecting the shavings there is a second blower system independent of the sawdust system. There are connections from the heavy planers to a fan with two branches in the discharge pipe, one going to the shaving bin in the kindling building and the other to a collector above the boiler house. From the latter there are five discharge pipes, one to the shaving bin already mentioned and one to each of the four boilers. At the branch in the delivery pipe from the fan a switch and valve are located which can be operated from the boiler room floor, thus permitting the fireman to regulate the amount of waste burned. If there is a market for kindling wood the strips may be collected from the fitting machines in boxes and wheeled to the kindling saws which are located along the side of the second storey nearest the boiler house. These saws cut the wood into ten-inch lengths, the pieces dropping onto a conveyor connecting with others which deliver the kindling into a large bin at the top of the kindling wood building. This bin is set high enough for wagons to drive under it and be filled directly from a chute in the bin above.

If the plant is located in or near a large city where the product can be consumed locally, it will be necessary to provide wagon sheds and probably a stable or garage, in order to team or truck the product to the point of consumption; whereas if the plant is located away from the market, the product will all have to be shipped by rail or water.

Choice of Location.—In this connection it might be well to consider some of the factors relating to the choice of location for a plant such as has been described. Is the freight on the raw material, such as the board stock, less than the freight on the finished product? In other words, is it cheaper to locate the plant near the source of raw material, owing to freight rate, labor conditions, etc., and ship the finished product to the point of consumption or to locate the plant near the point of consumption and bring the raw material to it? In some cases the freight rate may be the deciding factor, while in others the labor market, real estate values, taxes and insurance rates or the advantages of competitive shipping facilities may be the determining factors.

Construction and Equipment.—The buildings may be erected of mill construction or reinforced concrete, according to the relative cost in the particular locality under consideration. In general, concrete structures will be the more permanent, resulting in less cost for repairs and insurance, and will also afford more light. In some localities, however, the cost of concrete would be prohibitive as compared with mill construction. Whatever the type of construction, a complete fire protective equipment is desirable, including sprinklers, hose outlets in the buildings and yard hydrants. Whether a city water supply is available or not, a fire pump would be a good investment, with a reservoir of generous capacity to draw from, say 100,000 gallons for the plant illustrated, and an elevated tank to supply the sprinklers before the fire pump can be started. For heating, exhaust steam can usually be utilized; and in some cases cast-iron radiators can be put in as cheaply as coils, with the resulting advantages of closer local regulation of the heat and improved appearance of the work rooms. The requirements for lighting are not so exacting as in some industries, and good general illumination should suffice. Outlets should be provided on the walls and columns, however, for the attachment of portable lamps where required for use during repairs or on other special occasions.

Power.—Although power in a woodworking plant is cheap, the electric drive possesses several advantages over mechanical transmission. Large and expensive main belts are avoided, which take up room and require frequent renewal in a woodworking plant on account of the dust and chips.

Motors may be attached directly to the machines, or a motor may be arranged to drive a group. In either case the arrangement is more flexible than the mechanical drive, since a set of machines may be stopped without continuing to turn over a long line of shaft. Where there are so many auxiliaries in the shape of conveyors and fans, some of them in outlying buildings, the electric drive is particularly convenient.

Alternative Arrangement of Machinery.—In order to make our investigation complete, it might be well to consider for the moment another arrangement of machinery that is not based on the range of product as

was the case in the plant under discussion, but arranged according to sequence of operations; that is, arranged in the following grouping:—heavy planers, cutting-off saws, fitters, matchers, squaring-off saws, resaws, printing presses, assembly tables, nailing machines and final shipping. This would mean, then, that the various machine units must be purchased at the start to cover the entire range of product to be manufactured, so that unless the range were limited this would not be an ideal grouping of machinery. However, if the plant were manufacturing only a very few varieties of cases or boxes which were nearly identical as far as weight or size of material used were concerned, then this arrangement would be ideal, since it means continuous production and a maximum use of machinery. On the other hand, if the plant were going to manufacture an extensive line ranging all the way from boxes requiring light thin stock up to those taking heavy wide stock, this would not be an economical use of the machinery, for the reason that in a great many cases the machines would be working under capacity and under load.

Illumination of Woodworking and Furniture Factories

By J. R. Colville†

THE majority of woodworking and furniture factories are lighted with the old-style carbon-filament lamps. This particular industry appears to have side-stepped the universal tendency to improve lighting conditions. Time was when it was proper to use carbon incandescent lamps. A unit of extremely high candle-power is too intense a source for the lighting of woodworking factories. Before the introduction of the Mazda lamp the carbon lamp was, therefore, the logical lamp to use. However, there is no longer any excuse for poorly illuminated shops. The mazda lamp, reducing as it does the lighting bill and at the same time furnishing more and better light, has set a new standard for illumination.

That a new standard was necessary is readily acknowledged when serious thought is given to the importance of illumination on quality and quantity of production. Every manager knows that spoilage and accidents increase as winter comes on and decrease with the approach of summer. Obviously this is due to the decrease in natural light; further, conditions would be improved by better artificial lighting facilities. A modern system of lighting will decrease the number of accidents, decrease spoilage and increase production.

There are several important conditions that must be fulfilled in laying out a modern lighting system. They are: (1) Sufficient light of proper quality on the work; (2) A good intensity of light throughout the plant; (3) Freedom from glare; (4) Simplicity, reliability, ease of maintenance and low cost of operation. As mentioned above, it is highly important that there be a sufficient quantity of light on the work. The quality of the light should be such that a cheerful appearance results and at the same time colors appear in their true values.

There should be a good intensity of light throughout the plant. This not only reduces the danger from running belts, shafts, etc., but is much easier on the eyes. The continual dilation and contraction of the pupil of the eye upon shifting the gaze from the work to a dark part of the room and back again produces an effect similar to that produced by flickering light source. Light sources should not be placed in the direct line of vision. A bright spot of light causes the pupil of the eye to contract, which shuts out a great deal of what would otherwise be useful light. It is well, therefore, to hang the units high. A reflector, which, of course, is understood to be an essential part of a lighting unit, not only redirects into useful directions light rays that would otherwise be useless, but also has the advantageous effect of causing the light source to appear less brilliant and of larger area. As regards simplicity, reliability, ease of maintenance and low operating cost, a mazda installation possesses many advantages.

Different factories require different systems of lighting; however, woodworking and furniture factories can, in the majority of cases, be lighted by a general system of illumination, i.e., by one giving approximately a uniform intensity throughout the plant. The units should be hung in rows which are parallel to the side of the factory having the best day-light illumination. Using a switch for each row enables any row of lamps to be turned on independently of the other rows; this allows full advantage to be taken of natural light, the artificial light being used only as required. A furniture or pattern shop requires an intensity of illumination of from three to four foot-candles,* corresponding to from 0.6 to 0.8 watts per square foot. For rough work such as sawing, bending, etc., an intensity of from 1.5 to three foot-candles (about 0.3 to 0.6 watts per square foot) will be found to give excellent results. The spacing of units is dependent upon the height of the units above the work, the spacing distance being about 1.5 times the hanging height. The proper spacing is independent of the size of the lamps used; the wattage of the lamps should determine the intensity of illumination and not the spacing. On the other hand, the permissible hanging height determines the size of the lamps necessary for a given intensity. Bearing these facts in mind, and knowing that high wattage lamps are more economical in operation than low wattage lamps, it is readily seen that lighting units should be hung high. As a matter of fact, a hanging height of from ten to fourteen feet above the floor with a spacing of eleven to seventeen feet gives excellent results. For such a system, 100 or 150 watt mazda lamps and Holophane-D'Olier porcelain enameled dome-shaped reflectors will give the required intensity at low operating cost.

It is usual in woodworking shops to arrange the benches for hand work along the sides of the room. Hand work is usually of a fine nature and requires good light and plenty of it. This is easily taken care of by the general lighting system discussed above. It is necessary only to locate the outside row of units so that they hang above the working side of the bench; this will give the light where it is needed and troublesome shadows will be avoided.

The illumination system outlined above has been found to give far better results in practice than any system employing drop or individual lights. When mazda lamps and Holophane-D'Olier reflectors are used throughout a plant, a long step has been taken toward operating that plant at its maximum efficiency.

† Engineering Department, National Lamp Works of General Electric Company.

* The intensity of illumination on an object held one foot distant from an ordinary candle is approximately one foot-candle.

The Hardwood Market

THE present market conditions in hardwoods may be said to reflect practically a featureless continuance of the inactivity experienced during the past month. Amongst hardwood men it is generally expected that the market will be slow and inactive in December and January, but conditions at the moment are below normal. Dealers do not anticipate any material increase in orders until after the stock-taking period, which usually commences about January 1 and continues until the middle of the month. It is evident that the large manufacturing consumers of hardwoods are not desirous of anticipating their wants in more than a moderate way, consequently orders for such woods as are in demand are more or less from hand to mouth. The firmness with which prices have been held right along has had the tendency to check speculative buying and buyers are now waiting to ascertain the general business prospects after the beginning of the new year before doing much in the line of buying.

Of the hardwoods, black ash is about the only wood for which there is any demand at the moment, other woods being rather quiet; and these conditions are expected to remain until easy money makes its appearance once again. The tendency among most buyers for some time past has been to go slowly and to wait if possible until next year's business prospects are revealed a little more definitely. One bright phase of the situation, however, is that so far as prices are concerned, these are fairly steady, black ash, 1-in., being quoted at $40 and 1½-in. to 2-in. at $55. While betraying a more or less pessimistic feeling regarding the present conditions prominent dealers, however, are looking forward with confidence to considerable improvement taking place about the first of March.

A prominent Toronto firm makes the following summary of the market situation for the "Canadian Woodworker":—

"The condition of the hardwood lumber market in Ontario at this time, the middle of the last month in the year, is much the same as is experienced in all hardwood markets in the month of December in years past. December is the cleaning-up month with most hardwood buyers, wherein they wish to straighten up their purchases for the year just ending, before making new purchases for the year just beginning. At the same time, the manufacturer is anxious to move out and clean up certain stock which he does not wish to carry forward into the new year; consequently it is no surprise that with these two factors of the trade pulling in opposite directions—one to curtail purchases and the other to extend his trade—there is talk of a dull market. It is true that very little hardwood is being purchased this month, but it is also true there are never any large purchases in December, and in all probability the actual figures would show that the movement of hardwood at the present moment is not very much behind the December movement of previous years. Looking at the situation in its true light, it seems that the movement of hardwood is not unsatisfactory for this time of the year. Business in hardwood circles is probably better in proportion in Ontario than in the market across the border. Everything points to a fair volume of business for the beginning of the new year, and the best indication is that prices are holding up very nearly to the highest prices paid during 1913."

Commenting on general market conditions the "Hardwood Record" expresses the opinion that quite a number of mills are undoubtedly sold up on their stock and are selling right up to the saw at present. One large southern hardwood mill concern, which is typical of Indiana and Kentucky mill sections, states that this will be the biggest year in its history, and this concern has seen some pretty big years in the past. Then again, there is a class of mill whose reports show that while they are not sold up to the saw, the total aggregate volume of orders is equal to normal at this time of the year and they are maintaining a fair level of orders as compared to cut. Referring to mills which are actually accumulating lumber, the same paper says:—"In the majority of such cases these accumulations are in very strong hands and are really being held because the owners of stocks are not willing to let them go at below what they believe the lumber is worth. It is to be hoped that this course will prove within the next month or two to be wise. It is deplorable that the hardwood mill trade as a whole is not in a sufficiently strong position to follow the same policy, as such a policy if carried out would unquestionably react favorably upon both buyer and seller. As it is now, the buyer is constantly shopping for lumber, perhaps in some cases believing that he will get cheaper lumber if he waits. The result is that both the buying and selling ends are somewhat demoralized, neither one following its regular course, which necessitates great expense in selling and great uncertainty in buying, without the usual satisfaction on either side."

The general situation of the different woods is not materially altered, quartered oak being a strong item with plain oak perhaps a little weaker throughout the country.

"Seasonably quiet" is the general report as to conditions in the United States hardwood market. In most centres a normal amount of business is being done for this season of the year, and in view of the excellent prospects for 1914 no complaints of consequence are being heard. The probability of the currency legislation being disposed of shortly is a cheering indication, while other general factors seem to be more favorable than heretofore. There is no oversupply of lumber either at the mills or in the hands of consumers, and consequently the market, regarded from a technical standpoint, is strong. Prices are being well maintained, a few concessions on plain oak being about the only changes reported. Generally speaking, lumbermen are getting as much for their stock as heretofore, regarding the present lull as temporary, and, as stated, purely a normal development which recurs every year at this season. Quartered oak is probably the most active power. Sound wormy chestnut is in good demand. Some sales of thick poplar have been made of late. Cottonwood is quiet and red gum is showing improvement.

The trend in furniture styles is now in a direction which should mean a coming into favor again of oak to the position it should occupy in the cabinet world. Oak was the conspicuous wood during the mission period ,and there are some modifications of this in favor yet, but at first the turning from the mission was toward other woods, especially Circassian walnut and mahogany, in which to carry out new designs. Now, however, the drift is toward colonial and period work, which, while still calling for lots of mahogany and Circassion walnut, also shows more favor toward oak, with possibilities that both plain and quartered oak may develop into greater factors during the next few years than they have been the past few.

Manufacturing Processes and Equipment of a Leading Picture-Framing Industry

The Extensive and Up-to-Date Plant of the Phillips Manufacturing Company, Limited, Toronto

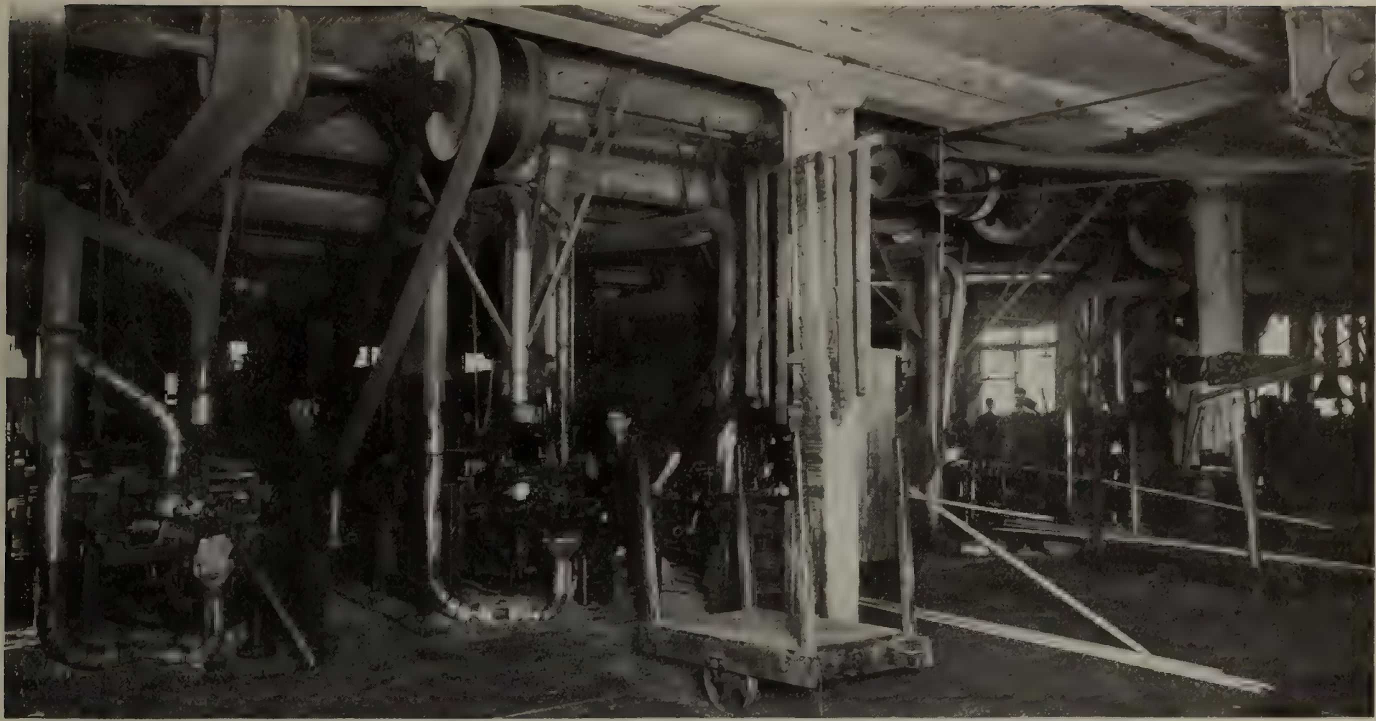
IN the evolution of the woodworking industry of Canada, a noteworthy position has been achieved by the Phillips Manufacturing Company, Limited, Toronto. The history of this firm since its inception has been one of uninterrupted progress and advancement, and today its products enjoy a reputation for all-round excellence second to none in the country. The extensive factory on Carlaw avenue is an interesting type and the following sketch of the development of the company and the modern methods employed in the manufacture of their products will doubtless be of interest to readers of the "Canadian Woodworker."

The company was established in 1876 as C. G. Cobban & Company, the plant having been located originally on Front street west, near York street. Later the company removed to Hayter and Terauley streets. This location, however, soon became inadequate owing to the steady growth of the business, and a five-storey building was erected on the water-front at the corner of Lake and Lorne streets. Changes were brought about in more than one direction. In 1881 the company assumed the title of the Cobban Manufacturing Company, and Mr. F. J. Phillips, who had been with the company previously, with Mr. W. C. Phillips, then took over the business. A further change took place some years later when the Cobban Manufacturing Company, Limited, was formed, with Mr. F. J. Phillips as president and Mr. W. C. Phillips as vice-president. In 1905 the name of the firm was changed to the Phillips Manufacturing Company, Limited, as it is now known. Meantime the business had advanced rapidly, and the need for larger premises having been fully realized, it was decided in 1906 permanently to increase the productive capacity of the business. To this end a building site of four and a half acres was secured, and the outcome is the present factory which occupies a commanding position on Carlaw avenue, in the eastern section of the city. The floor space, 160,000 square feet, is practically three times that of the space covered by the building on Lake and Lorne streets, a fact which conveys some idea of the expansion brought about. The building was completed in 1907 and occupied in December of that year. It may here be mentioned that the present head of the company, Mr. H. B. Phillips, who entered the business in 1891, succeeded his father as president on the latter's death in the early part of 1910.

The factory is of two storeys, being designed so as to afford the maximum of output with a minimum of labor. Lighting, heating and ventilation were studied with eminently satisfactory results. The plant is housed in three buildings, apart from the large power house and dry kilns which enter so largely into the manufacture of the finished article.

No. 1 building, in which is contained the office, show room and shipping department on the ground floor and the gilding and finishing departments on the second floor, is connected with building No. 2 at the west, which contains the glass bevelling, polishing and

Frame sawing and joining department.



View in mill showing moulding machines.

silvering departments. No. 3 building, which faces on Carlaw avenue, includes the moulding stock room, frame joining department, composition and whitening departments, with the storage vault for mouldings and patterns on the upper floor. The entire ground floor is devoted to the mill and sticker department, veneer moulding and glueing departments, sanding and tool room.

The power plant is installed in a separate building and consists of a 500 h.p. Corliss engine driven by three boilers supplied by Goldie & McCulloch. This plant supplies power for the operation of the machinery and also heats the building, operates the five large hoists, each capable of accommodating maximum length of material, and furnishes the necessary heat for the dry kilns.

The dry kilns consist of a battery of four, supplied by Sheldons, Limited, of Galt, Ont., each having a capacity of 40,000 feet of lumber.

The company has a switch from the main line of

The whitening department.

the Grand Trunk System, with two branch spurs into their lumber yard.

The lumber principally used is Canadian basswood, quartered and plain oak, gum, birch and ash. The company carry a stock of about one million feet of lumber all the time and consume in the neighborhood of five million feet annually.

The products consist of picture mouldings of all kinds, a specialty being made of veneers in Circassian walnut, rosewood, mahogany, etc.; room mouldings, picture frames and framed pictures, framed mirrors, glass bevelling, polishing and silvering.

Adequate precautions have been taken against fire, a complete sprinkler system being installed throughout the buildings. This system is supplied by a huge tank holding about 120,000 gallons, the fire pump installed by the Canada Foundry Company, having a capacity of 1,200 gallons a minute. As a further safeguard there

A section of the glass bevelling department.

are large fireproof doors throughout the factory, shutting off each department from the other.

To describe the processes of manufacture it is necessary to begin with the raw material at the dry kilns. After the process of steaming, the lumber passes through the kiln, the drying occupying a period of from five to twelve days, according to the kind of wood—oak, for example, taking a considerably longer time than bass or other soft woods. The drying process having been completed, the lumber is taken on transfer trucks to the mill, where it is sawn and ripped to various sizes, five rip-saws being installed for this purpose, as well as cut-off and swing saws. In this section there are also a band resaw and large circular resaw for the manufacture of wood picture backing. From the saws, the strips, now reduced to their proper widths, are conveyed on trucks to the moulders, of which there are seven. These moulders and the other machinery in the mill are from Ballantine, of Preston; McGregor, Gourlay & Company, of Galt; Berlin Machine Works, Hamilton; Fay & Egan Company, and others.

A fully equipped grinding and tool room, where the moulder knives are made and the saws kept in proper order, is also a part of the mill equipment. Here also are stored the thousands of knives and templets necessary for the great range of patterns of mouldings, while there is a packing case section, completely furnished with nailing tables and other equipment.

From the moulders the trucks containing the mouldings, if intended to be finished without whitening or ornamentation, pass to the sanding department, where the surface is sandpapered or planed and made ready for the polishers. In this department there are are also in use two of Black Brothers pioneer sanding machines.

Should the mouldings be destined for gilding they are conveyed by the large hoist to the whitening room on the floor above, where the operation of whitening requires about two days, it being necessary to apply five or six coats to get a proper surface for gilding. The whitening plant consist of five whitening machines of the Zoeller type, capable of turning out about two and a half million feet of moulding per annum; with necessary steam kettles and mixers.

The whitened mouldings as they leave the machines are placed on large racks and mounted on trucks, on which they proceed to the gilding department or frame joining room as required.

Next to the whitening department is the composition ornamenting and embossing department. Here are five machines used for the ornamentation in composition and also for the production of embossed or pressed mouldings, now so popular. There are also embossing presses for the printing of customers' names, or other advertisement on showcard frames, in various colors or gilt. The hand ornamentation in composition of fancy frames and mouldings is also done in this department. The greatest skill is necessary in the exacting work of ornamenting, as the slightest error of judgment would seriously affect the quality of the finished article.

In connection with this section of the works there is a large storage vault in which are kept the carved

A corner of the composition mounting department.

A corner of the veneered moulding department.

brass rollers for machine ornamentation, electro and boxwood moulds, etc., for the ornamenting of mouldings and frames.

The frame sawing and joining department has six power saws with moving tables, power tramp machines and other labor-saving devices necessary for speedy and economical work. The company specialize in show card framing and many thousands of frames (for railway, steamboat and other companies using the framed picture as an advertising medium) are turned out each year. The framed picture branch of the firm's business is of large proportions and with the advertising framing mentioned above there is required, at all times, a large staff to execute the orders covering this line.

One of the important departments in Building No. 3 is that of the veneered mouldings. The equipment consists of the necessary presses, clamps, etc., also cauls covering various patterns of the mouldings manufactured. The patterns most widely used are flat, round top and pyramid. This veneered moulding has become exceptionally popular during the last few years and the company has kept right up-to-date, producing new lines from time to time as the trade demands. The artisans employed are skilled in their various portions of work. This section is fitted up with the very latest appliances for the production of the finest veneered mouldings, the work of glueing and pressing being done in a room of the temperature where best results may be obtained.

Included in this department is also the manufacture of fine oval frames, made in the various woods, and veneered placque frames, requiring band and jig saws, shaper, belt sanders, etc., as machinery equipment.

The upper floor of Building No. 1, to which the unfinished product goes for finishing, is devoted entirely to the gilding department, which embraces sprayed bronze, silver gilt and gold burnished work; also the polishing department, which includes the printing department where basswood mouldings are grained to imitate various woods, and oak, birch, gum

The finishing department, where the mouldings are stained and polished.

and other plain mouldings receive their finish. In this room a great deal of analine is used in the process of staining.

From these departments the mouldings and frames when completed, after being carefully wrapped, are sent to the assembly room, there, in turn, to be passed into the hands of the shipping department, or, if fitted with pictures, they first go to the fitters and thence to the assembling department.

One of the most important departments in the factory is that in which the process of mirror-making is carried on. Properly speaking there are several departments connected with this branch of the industry. Converting the sheet of clear glass into the silvered and copper plated mirror is the work not of a day but of several days. First the glass is taken and cut up into various sizes and according to the desired pattern, then it passes to the bevelling room to undergo

A portion of the glass polishing department.

the process of roughing, smoothing and finishing. From there it is taken to the polishing department where the surface must be highly polished before it can emerge a finished mirror. After having received a thorough polishing and having any imperfections removed, the glass is ready for its removal to the silvering room. Temperature being an important factor in this process, the silvering department is specially heated to about 120 degrees. The glass is laid upon huge steam tables and a solution of silver is applied until the desired metallic coating is obtained. Afterwards a coating of copper is laid on by an electrical process. This is what is called the copper-plate process, and outside the Phillips Company it is said to have been adopted in but three other mirror-making factories—one in England, one in France and one in Belgium. The delicate treatment to which the glass is subjected requires very skilled handling, but the overseer in charge of this department of the work has everything at his finger-ends, with the result that the high standard of quality always is maintained. The capacity of the silvering department is about 2,000 feet a day.

After leaving the silvering room, the mirror is conveyed to an adjoining department to have the back coated with a protecting material. This done it is sent to the cleaning department, preparatory to shipping.

The drying room in which the mirrors are dried at the various stages of manufacture is an enclosed apartment at one end of the same floor. A constant temperature of about 125 degrees is maintained in order to complete the drying as expeditiously as possible.

The output of this factory is in the neighborhood of seven million feet of moulding per annum. Practically the entire manufacture is consumed in Canada, the whole of the Dominion being covered by seven travelling representatives who visit every town and city where mouldings are used. Some goods are also exported to the West Indies, New Zealand and Australia, but as a rule there is a sufficient demand within the Dominion for the whole output.

The company have between 250 and 300 employees, most of whom are skilled operators. In this connection it may be stated that a considerable number of these employees have been with the firm for twenty years and longer, and some since the commencement of the business.

Output of American Walnut Lumber

By W. L. Fletcher

THE people in general throughout this country, as well as manufacturers of the better class of furniture, seem to have been laboring for several years under the mistaken idea that walnut timber, and therefore walnut lumber, was a thing of the past and could not be obtained in sufficient quantities to justify the manufacturers in making a line of this kind of furniture.

Upon going into the matter thoroughly and gathering statistics which are undoubtedly reliable, we find that the output of walnut in the United States is about fifty million feet annually, probably somewhat more rather than less than this amount. It is also a fact, undisputed by those who are in close touch with this business, that at least this amount will be produced each year for several years to come. Asked why they did not make a line of walnut furniture several manufacturers have replied that they would like to, but could not get the lumber in sufficient quantities to justify it. The fact that probably forty millions of the fifty millions now produced annually, goes to Europe for furniture use, would seem to indicate that the manufacturers "know not whereof they speak." During the past year, however, there seems to have been more interest taken in this question, and inquiries from manufacturers of the best class of furniture are becoming quite frequent, which is a very hopeful sign.

The people of European countries, more especially England and Germany, have long realized the many good qualities possessed by black walnut as a fine cabinet wood. The fact that it does not warp when exposed to heat, that it does not shrink or swell to any noticeable extent when exposed to dry or moist atmosphere, that it does not show fingerprints or small scratches, and that it grows better with age, places it far above the woods now commonly used for the higher grades of furniture, viz.: oak and mahogany. In my opinion the time has arrived when the people of America will awaken to the fact that their neighbors across the water are stripping this country of the very finest timber and will demand that what is left of this beautiful cabinet wood shall remain with us.

The filer or machine man who has to ask for twice as much as he needs to get what he requires, is in a bad way. He should get out of it by asking only for what he needs, when he needs it, and insisting on getting it.

Two Handy Wood-Frame Benches

Contributed by Leonard A. Blake

THIS is the age of cheap machines for small jobs, but it may happen that there are some factories and mills which would find it convenient and cheap to make some of their saw benches with wood frames to carry the saw arbor, when the latter item is easily to be obtained with both bolts cast on one frame. It is with this idea that the writer has given herewith sketches of two wood-framed machines which are easily made in any small

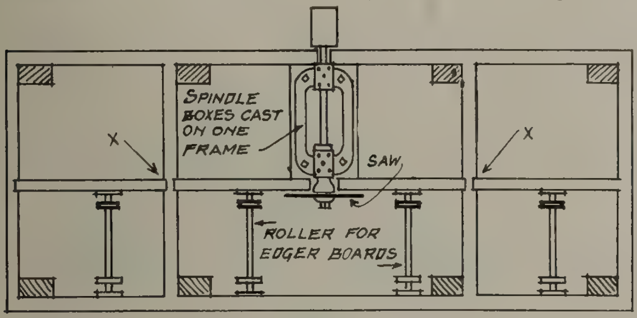


Fig. 1.

woodworking shop, and which will stand up well under hard work.

Fig. 1 shows a plan of the framing for a small edger saw, with running table outside the saw. The over-all length of the machine from which the plan is taken is about 8 ft. and the width 3 ft. 6 ins., but of course these sizes can be varied according to individual requirements. A machine of this size will straighten stock up to 60 inches long with perfect accuracy if the rollers are well aligned.

Hardwood is to be preferred, of course, but sound pine will do. Whatever the lumber, it should be dry or warping of the frame will take place and instead of a straight cut there will be some beautiful curves and much jamming of the saw in the cut. The outer rails of the frame should be about 6 x 2, with the legs 4 x 2½. The position of the legs is shown by the

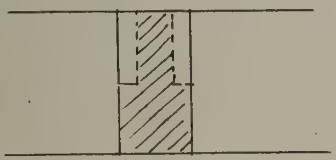


Fig. 2.

Showing ends of middle bars notched into cross bars as at xx in Fig. 1.

shaded parts in the figure. As will be seen, the cross bars which carry the bench top are secured to the legs as well as to the side rails. This ensures the screws having a better hold than they would if driven only through the side rail into the end grain of the cross bar. To carry the rollers for the running table, and also the inner end of the saw arbor bearing frame, three bars are fixed between the cross-bars. They are of 4 x 2 lumber, the same as the cross-bars, and the bars should be notched half of their depth to take the ends. (See xx Fig. 1 and small fig. 2). These middle bars are kept close to the side of the saw to carry the edge of the fixed part of the table, and are therefore not quite in the centre of the frame. In the machine taken as an example they are 22 inches from the rail on the pulley side of the machine, but sometimes it is not necessary to allow so much space on the pulley side of the saw. Diagonal braces should be placed across the ends of the frame between the legs to ensure rigidity.

The bearings for the saw arbor are carried on a piece of 2-in. lumber, wide enough to carry the frame casting. One end is screwed under the middle bar, while the other is fixed to the inside of the side rail. Rollers with bearing plates to screw on to woodwork can be obtained together with the saw arbor and boxes, and also slide and clamp for the gauge.

The fixed part of the bench top is made of hard maple or beech one inch thick screwed down on the frame. A loose piece is put over the boxes to allow of removal for oiling. A single wide board is the best thing for the running part of the table if a good straight-grained piece can be got. For this frame the board is 6 feet long. The rails which fit the rollers in the frame, and which can be obtained with them, from most manufacturers of woodworking machinery, are screwed to the bottom of the running board, and care must be taken to get them straight. Also, see that the V-rail is on the right side to run on the grooved roller. A piece of hardwood across the end of the board serves as a handle and stop to hold the

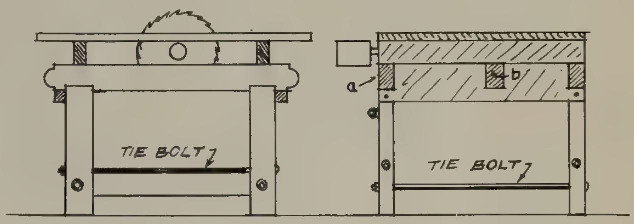


Fig. 3. Fig. 4.

stock. A small spike near the inner end of this cross-piece will prevent the wood from sliding sideways. If a longer cross-piece is put on, with a movable stop, the runner may be used for cutting off stock up to 3 ft. in length.

This is a very handy saw, for in ripping stock the operator is able to place his first cut just where he wants it, and therefore a considerable waste of time and lumber in mis-cutting is avoided.

Figs. 3 and 4 give side and end elevations respectively, of a plain rip-saw table. This is only useful for short stock or other material that does not require edging. The frame is of 4 x 2½ lumber almost throughout, except for the end rails which carry the middle bar (b) in Fig. 4, and they are made 6 x 2 so as to leave some bearing for the middle bar, while at the same time they carry the ledges of the top. As the table is small, being only 3 ft. x 4 ft., the frame is also much simpler. The side frames are put together first, and if a little bandsawing is done around the top rails, in the way of rounding the ends and making recesses for the legs, it will add to the appearance and solidity of the completed job. It is also a good plan to put a tie-bolt from one leg to the other along the bottom rail (See Fig. 3). This bottom rail of the side frame should be kept up from the floor about 4 inches to facilitate the removal of sawdust, which is pretty sure to accumulate whether a cyclone is used or not. In the case of this bench there will

be no base-board for the arbor boxes but they will be bolted on the side rail and middle bar marked a and b respectively in Fig. 4. The bottom end rail may go along the floor and be used to bolt the bench to the floor instead of driving nails or screws at an angle through the ends of the legs, as some do. In order to give the top enough clearance over the boxes, the ledges are 4 x 2 stuff. One ledge is hinged to the frame and when it is necessary to change the saw, or oil up the bearings, the table is tilted up and propped with a stick. If it is desired to have the saw project only a certain depth, as for grooving, a screw with some form of handle on wheel, and passing up through the top end rail, can be used to adjust the elevation of the table. Narrow strips of hardwood, say 1½ in. x 2 in., glued together, make a good table. In case the machine would be used for ripping a lot of narrow stuff, there would be a tendency to wear a furrow near the saw. To obviate that difficulty a thin steel plate, such as a piece of a broken resaw with the teeth ground off, and let into the table just alongside the saw, will answer very well.

Fig. 5 illustrates a form of gauge in use with some wooden saw tables. It has the advantage of not requiring a groove in the table. As will be seen by the sketch, the gauge proper is carried by two arms hinged to it, the arms being pivoted on bolts passing into the table near its outer edge. The clamping of the gauge is accomplished by a semi-circular iron bar which slides through a guide with set-screw on the arm nearest the operator. When the bar is fixed on the gauge, it should be centered to the pin of the hinge. An advantage of this form is that it can be easily moved by an operator standing directly in front of the saw, while some of the sliding gauges in grooves are inclined to stick if anyone tries to move them by one end.

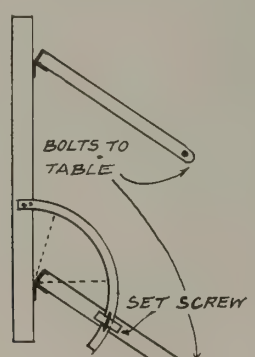


Fig. 5.

Probably there are some woodworkers who have been using machines such as those described, but it is equally probable that there are some who have not and who will find them useful if they know of their merits and manufacture. It is to these latter that this article will be interesting and possibly useful.

One of the most remarkable of the many valuable hard woods of Australia is yate. This tree apparently furnishes the strongest timber known. Its average tensile strength is twenty-four thousand pounds to the square inch, equal to that of cast iron. Many specimens are even stronger, and one was tested up to seventeen and one-half tons to the square inch, a tensile strength equal to that of wrought iron. The tree sometimes grows to a height of one hundred feet, and is often more than two and one-half feet in diameter.

Veneer and Panels

PRESIDENT Jarrell read a very interesting paper before the National Veneer and Panel Manufacturers' Association at the 8th annual meeting in Chicago on the 10th of December. Referring to veneer and panels Mr. Jarrell said, "There is no question that the use of veneers and built-up panels is greater today than ever before and that new avenues are constantly being opened up for their entrance and use. The idea that veneers and goods manufactured of veneers are inferior has been superseded by the knowledge that for quality, beauty and utility, products of the mills represented here today must be used. Prejudice against certain woods that formerly were considered practically worthless has almost entirely disappeared, and buyers as a rule are willing to pay fair prices for satisfactory stock.

Veneer Wall Paper

FOR some years wallpaper has been manufactured to imitate veneers, but now several veneer manufacturers are producing a real veneer wallpaper. That is, they are cutting high-grade veneers no thicker than 1/16 inch, and, after proper treatment, paste to the back of this veneer a thin, but strong paper. The paper back is put on for the sole purpose of holding the veneers to wall boards or plastered walls. A writer in the magazine Veneers recently visited a bungalow which was being finished in the mission or panel-effect style in which such veneers were used instead of panels. He found the workers cutting the veneers in the regular paper-hangers' trimmer, then matching them up and putting them on the walls with common flour or paper-hangers' paste. The job was as simple as the placing of ordinary wallpaper. The hall, having veneered mahogany doors and woodwork, was papered with mahogany-veneer paper; the dining room, with quartered-oak veneer, and the smoking room, black walnut veneer.

Is the cost of properly inspecting veneer greater or less per thousand feet, surface measure, than the cost of inspecting lumber per thousand feet, board measure? This is a pertinent question, because proper inspection is essential to successful business in either buying or selling, and it is an item in cost that we should have an exact measure of. For fine face veneer the inspection cost is undoubtedly high as compared to common stock, because it must be gone over carefully to discover small defects, while common stock, used for drawer bottoms and for back panels, can be glanced over rapidly and the inspection made at much lower cost. It perhaps costs different people different sums to properly inspect their veneer, and perhaps the man whose cost is really the highest is the one who doesn't spend as much at inspection as he should and pays the penalty in the way of careless packing, which results in complaints on the one hand and the loss of good veneer on the other. The right idea in connection with inspecting veneer is to make the job thorough and figure out just what it costs, and then plan to spend that amount on inspection.

A splendid side qualification for every machine operator to have is the faculty for patching the splicing belts neatly. A good man at this kind of work is not only appreciated, but he stands more chances of readily finding a job somewhere else.

Methods of Sharpening and Setting Planer and Jointer Knives

(Contributed)

SEVERAL articles have been published recently in the various woodworking journals relative to the different methods adopted in the sharpening and setting of planer knives. To the average mill man, who likes to be posted, many of these methods are of considerable interest. We all have our different ways of more or less accurately sharpening and setting our knives, and every month we pick up new ideas through our journals.

A short time ago we read of a method of using a vertical stand that could be raised and lowered and which had attached to the top a block hanging down from a hinge. This hinged block projected from the upright of the vertical stand, out over the cylinder head. The idea of the apparatus is that when the knives are revolved slowly it can be noticed whether they merely touch or slightly raise the block. As to the merits of this method, it is well known that the majority of planer beds will show, after very short usage, more or less wear in the middle from more stock being fed at that point. Therefore such a device as is above suggested, when used on the extreme edge of the planer bed—where the bed shows no wear —would doubtless prove of some value. But what is going to happen when this same device is placed at or near the middle of the bed, presuming the bed to be worn and that the knives have been retouched more heavily in the middle than on the end, as is so often the case when they are filed? It is possible to see at once that an error can occur notwithstanding that our testing apparatus shows a correct reading. For example, put an inch board through the centre of the planer, then measure it carefully as to thickness. It is found considerably thicker in the centre than at the edges. The knives though apparently set true, are slightly hollow toward the middle, and we have been deceived in our reading of the testing apparatus for the reason that the hollow toward the centre of the knife, when the knife is on top of the head, practically corresponded to and is parallel with the hollow or wear in the centre of the planer bed. This hollow of the knife, of course, is reversed to that of the bed when the knife is in the act of cutting.

Another method suggested has been that of laying steel straight-edges on edge along the side of the planer bed and then allowing the bed or cylinder, according to the construction of the planer, to be moved up or down until one or both of the straight-edges become lightly pinched between the bed and the cutter head or knives, by this way determining their alignment. Here again there is almost as great a liability of error as by the first method. The third method, which seems to be a step far in advance in many ways, is sure to create not a little interest. Not long ago the writer was shown in a large South Bend, Indiana plant, an entirely new process that seemed to combine both sharpening and setting of knives in one operation. He was informed that the setting of the knives seldom had to be done even on the round safety heads, and as for sharpening, that had reduced itself into a ten minute job. Two of these machines were at work in this plant; one in a room of jointers and the other in the planing mill, and the rate at which they were being removed from the different machines, whose knives were being sharpened, was a marvel. This machine, which is set on either the in-feed or out-feed end of the planer, might be called a micrometer portable grinder.

Let us inquire into the merits of this device. These may be enumerated as follows:—1—Much time has been saved in not having to remove the knives, although if the knives are in very bad condition they must be ground on a floor grinder once every two months. 2—The knives are tempered harder than usual, so hard, in fact, that a file does not touch them. 3—They are sharpened while held under the same strain as when in use. This certainly does away with jointing, which always results in creating a heel. 4—What can be said relative to their set? This was what interested the writer more than anything else, especially as he noticed the thrust bearing between the motor and grinding wheel which permitted the latter to move up and down a trifle. This apparently would throw out the micrometer reading on the scale of the machine, an eventuality which, however, does not occur as the writer noticed and afterwards tested on another knife with a straight-edge. In sliding the grinding wheel while running along the knife we ground the high spot which we had marked but did not touch the low, and in one of the low spots the micrometer reading showed a hollow of over 6-1000 deep. It was noticed when we had taken off these high spots that the micrometer reading had practically come down 6-1000. We all know that when gears are in use on a micrometer instrument there is bound to be some slight play, and we noticed on this machine that when we had raised the motor high enough to permit of the next knife being turned into position, returning to the same micrometer reading it was necessary to come down a little lower, then return to the reading desired. This had a tendency to set the gears, Such a method in setting of knives of course has never before been approached to such a degree of perfection. 5—To return to a discussion of the first two methods there is no mistake in stating that by the use of this last method we still must suffer to a certain degree from the wear of the planer bed, but this error seems to me to have been greatly reduced for the following reason:—the width of the base of this machine is sufficient to allow of its getting a true bearing across the bed of any average sized planer, as our knives are practically sharpened and set in a perfectly straight line. As it is impossible with this machine to have it otherwise the makers are careful to have the slide rail exact. The error, then, which occurred in the first two methods of measuring the set has been greatly reduced and it is only possible for it to amount to the wear which has taken place in the planer bed.

A great deal more could be said relative to this progressive idea of sharpening and setting knives in one operation without removing them from the heads. I am sure many of us will be anxious to join this new progressive party and as my old friend who was operating this machine said:—he was mighty glad he didn't have to use his blind eye any longer in whittling his planer knives down to a 1-1000 of an inch perfect cutting circle.

South Africa—The Opportunity for the Manufacturer in the Woodworking Industries

By J. F. Wandless

ONE of the best markets awaiting the Canadian producer, whether he be farmer or manufacturer, is undoubtedly South Africa. That country, so rich in mineral wealth, not only does not produce enough food for its population, but has to depend upon its imports for nearly every article of domestic or commercial use.

Difficulties Confronting Trade Agent

At the close of the Boer War, in 1901, the Canadian Government appointed a commercial agent in South Africa, whose duty it was, primarily, to establish a market for Canadian produce and manufactured goods in that country, and also to aid any South African exporters who might wish to introduce their goods into this country. The innovation, at first, did not meet with great success. This was due to several reasons. In the first place, South Africa is so entirely different from Canada that a Canadian finding himself transported there almost fancies he is in another world and for a considerable time is entirely out of touch and sympathy with the country and its people. Then again, probably more than three-quarters of the population are natives, who, although they are consumers to a certain extent, are totally beyond the agent's personal reach; he does not speak their language and finds it difficult to get at their needs and requirements. Then again, take the white population, considerably more than half are of Dutch extraction and the greater part cannot speak English, or only have a limited knowledge of it. These are some of the difficulties confronting a trade commissioner upon his arrival in that country, and if, as has been the case, he is an old man, he is not able to assimilate the atmosphere and adapt himself to his new environment and so loses his value, to a great extent, as a commercial agent. Recently, however, a new trade commissioner has been appointed who seems to be a hustler and to be able to get in touch with the commercial requirements of that country, as is evinced by the great number of trade enquiries he sends in to the Weekly Reports of the Department of Trade and Commerce. These, in fact, have lately been exceeding tenfold the number of enquiries received from our commercial agents in all other quarters of the globe.

Trade Already Established

Canada at the present time has a considerable trade with South Africa. Our flour, bacon, cheese and apples are greatly in demand, and our furniture and agricultural implements also command a wide sale. A market for Canadian goods was worked up somewhat slowly at first in South Africa, but good quality and reasonable prices finally created a demand which has been steadily increasing ever since. A severe blow, however, was dealt to the Canadian trade by some Ontario apple growers about the year 1904. The gentlemen in question, evidently inspired by "get-rich-quick" ideas, sent a shipment of apples to South Africa, the top layer of which in almost every barrel was first-quality, while the remainder were very inferior. This incensed the South African importers very much and for a period Canadian trade suffered. It has, however, entirely recovered from this temporary set-back, and it is to be hoped that no branch of the Canadian export trade will ever act so foolishly in future. "Honesty is the best policy" and brings in more money in the end.

A Treeless Country

The Canadian furniture and woodworking industries will find, if they investigate, that there is a great demand for their goods on the South African subcontinent and this will probably always be the case, at least for some generations, as South Africa is practically a treeless country. Cape Colony, with the exception of the Cape Peninsula, is one vast "karoo" or desert. The only vegetation which it supports is the karoo bush or sage bush, which seldom grows more than two feet high, and which furnishes grazing for the flocks of sheep and goats from which the dwellers in these parts largely derive their livelihood.

As you leave Cape Colony and enter the Orange River Colony, the karoo bush gradually disappears and grass takes its place. You are now entering the high veldt, which is also treeless except for the imported eucalyptus to be seen around the homesteads and the wacht-en-betchi boom, which grows along the water courses. The latter is a gnarled and stunted tree, seldom growing more than 14 or 15 feet high and is only useful for fencing and firewood.

Forests of Stunted Trees

The Transvaal is also treeless, with the exception of the low veldt, which stretches across the northern part of the country. This low-lying country is in the greater part marshy and full of streams and rivers, and consequently vegetation is more luxuriant. It is covered with a perfect jungle of trees of which the wacht-en-betchi aforementioned is the most prominent. Most of the species of trees in the northern Transvaal are of the thorn variety. They are dwarfed, full of knots and generally unsuited for most manufacturing purposes. While there are to be found trees in both Natal and Rhodesia suited for furniture and other manufacturing purposes, yet the forest area in either province is not great and even if manufacturing industries in these lines were started they would be totally inadequate to deal with the home demand.

The Furniture Manufacturer's Chance

Here is the opportunity for the Canadian furniture manufacturer and if he fails to take advantage of it it is his own loss. Some Canadian firms have already established agencies in South Africa and are doing a very considerable trade. Among these are the Rhodes Curry Company, Limited, Amherst, N.S.; J. B. Snider and The Globe Furniture Company, Limited, both of Waterloo, Ont.; The National Table Company and The North American Bent Chair Company, both of Owen Sound, Ont.; and Messrs. Thomas Brothers, of St. Thomas, Ont.

Mining Creates Demand for Handles

The principal industry in South Africa is mining, the whole country being one vast mineral bed. There are found gold, copper, tin, coal, diamonds and many other minerals, and mining is carried on practically

all over the country. This industry is the opportunity for the Canadian manufacturer of handles—pick, shovel and hammer handles being in great demand. The Canadian handle has already entered this market and a large demand has been created for it. Messrs. J. H. Still & Company, of St. Thomas, Ont., are probably the leading exporters of handles to South Africa and do a considerable trade there. Broom handles and brush ware are also in demand.

The South African is nothing if not musical and the Canadian manufacturer of organs who neglects this market is doing so to his own disadvantage.

Agricultural Implements Wanted

Although South Africa is not primarily an agricultural country, yet with irrigation and improved methods of farming and with the demand for agricultural produce so great and prevailing prices being so high, there has been a steady increase in the area under cultivation and modern methods are being adopted. Here is the opportunity for the Canadian manufacturer of agricultural implements, and it might be mentioned that those of Canadian manufacture are considered very highly by both the Boer and imported farmer. If you take a journey through the country you will find that most of the new agricultural machinery is of Canadian manufacture—the products of The Cockshutt Plough Company, of Brantford, Ont., and the Massey-Harris Company, of Toronto, seem to be the favorites. There is also a demand for Canadian buggies, which are gradually superseding the cumbrous "Cape cart" of the farmer.

South Africa Requires Wood

We could go on to some length specifying the demand for particular articles of wooden manufacture in South Africa, but will close with the statement that the principle need of South Africa seems to be **wood**, and any article of domestic or commercial use made of wood **must** command a ready sale. So great is the demand for wood in that country that the houses are invariably made of brick, mud, or corrugated iron, and fires are made of coal in the towns and cow dung in the country. Lumber for mine timbering is imported from Canada, Sweden and elsewhere, and the mine owners have planted the eucalyptus or Australian blue gum around their mines all over the country in the hope that these rapid growing and useful trees will at some future date be able to at least partially supply the demand for shaft timbering.

Yes, South Africa is a great field for the Canadian producer and manufacturer, particularly the latter who is engaged in furniture or woodware industry. Here is the opportunity and some have already taken advantage of it and are reaping a handsome profit, but there is room for all.

Transportation

The Elder-Dempster line of steamships run at the present time about one steamer a month from Canada to South Africa, sailing in the summer time from Montreal and in the winter from St. John, N.B. These call at Capetown, East London, Port Elizabeth, Durban and Lorenzo Marques on Delagoa Bay. Unfortunately, as yet, there has been no export trade created from South Africa to Canada and the boats, after unloading the Canadian products, have to steam in ballast to India, Argentine or Australia in search of cargo. This will be remedied in time, however, as there are many South African products in the knowledge of the writer that would have a great demand in this country, and would probably mean the making of the fortunes of those who introduced them.

Demand Will Increase

Although the demand for manufactured goods is so great in South Africa at present, it will undoubtedly increase in the future as the native population becomes more civilized and better educated. Their "simple life" will then be over and their wants more numerous. Already this change is taking place. The negro differs from the American Indian, Australian aborigine, and many other savage races in that he does not disappear before the advance of civilization. The native population in South Africa was never greater than it is at the present day, and the prospect is rather for an increase than otherwise.

Natives Becoming Civilized

If you visit the kraals all through the country you will find children, and even grown-ups, busy with spelling books and trying to get a knowledge of reading and writing. It is surprising, too, how rapidly they acquire an education and they are, of course, assisted in this by the missionaries and other philanthropic people. There are now many native missionaries and clergymen scattered about the country and these are invariably well educated, many of them being graduates of some English or American university. These are devoting considerable time to the education of their fellows. In several parts of the country there are printed native newspapers. Of course, they are printed mainly in Zulu, Basutu, or whatever language the nation living in that part of the country may speak, but you will usually find a leading article or two in English, the object evidently being to cultivate among their readers the study of that important commercial language. The English articles appearing in these papers, although written by natives who were born in at least a semi-savage state and who acquired the English language comparatively late in life, are nevertheless wonderful examples of pure English, while the deep thought shown in some of them and the knowledge displayed of the classics and dead languages would put the great majority of newspaper men in this country to shame.

These people are then waking up, and they are fast awakening. Their demands will increase and the man on the spot knowing what they want should be able to give it to them and reap the benefit accordingly. Big as the trade is that has been worked up by Canadian manufacturers and exporters who have invaded this market, it will undoubtedly be at least tenfold greater in the future, for with the civilization and education of the native his wants will increase.

Steaming Logs Under Pressure

SOME valuable suggestions were made by Mr. Henrik Cronstrom, of Finland, in a paper read by him before the members of the National Veneer and Panel Manufacturers' Association at Chicago on December 9th. His outline of the process in vogue in that country in the veneer industry indicates that their methods are entirely different in many respects from the methods employed by American manufacturers. Of particular interest was his detailed description of the process of steaming logs under pressure and the excellent results obtained therefrom. This suggestion is worthy of careful consideration on the part of manufacturers of this country as it has been proven that high results can be secured through the steaming of lumber under pressure after sawing.

Noteworthy Features of a Large Woodworking Plant at Vancouver

The Terminal Construction and Manufacturing Company's plant in which manufacturing costs are reduced to a minimum by careful lay-out, efficient lighting, adequate equipment and an efficient vacuum system.

ALL visitors to Vancouver express amazement at the city's exceedingly rapid growth and the amount of building work under way despite the financial stringency that has prevailed in Western Canada for the latter part of the year now drawing to a close. But for the tightening up of the bankers' purse strings, last year's record of over $18,000,000 worth of new buildings in the city's three mile radius would have been largely exceeded; as things stand, the showing for 1913 will be a handsome one.

Be it the majestic skyscraper, the massive business block, the imposing apartment building or one of the pretty homes for which Vancouver is noted, wood figures largely as a finish material, hence the city's numerous woodworking factories have enjoyed a period of marked prosperity during the past four years. Particularly is this true of the great plant at the corner of Yew street and Twelfth avenue, owned and operated by the Terminal Construction and Manufacturing Company, Limited, of which Mr. H. P. Falls is president and managing director, and Mr. E. W. Falls is secretary and mill superintendent. This factory is undoubtedly one of the most modern and up-to-date of its kind in Western Canada, and most visitors to the city spend several interesting hours on its floors scanning the work of the large staff of skilled artisans employed in the various departments.

The firm commenced operations in Vancouver in July, 1907, with the intention of erecting houses for sale and carrying on a general contracting business. In order to keep at a minimum the cost of materials used and also to assure themselves of prompt service, they purchased the plant and equipment of a small factory situated in the east end of the city, to which they immediately added additional machinery of a more modern type. This put the plant into such good shape that the firm were able to take on custom work in addition to their own, and in this way developed into the general factory business. By paying special atten-

Plant of the Terminal Construction and Manufacturing Company, Limited, Vancouver.

tion to business, and by giving customers a high grade of material, the management speedily worked up a trade in excess of the working capacity of their factory. Therefore it became necessary to provide facilities to cope with the increasing demands of the building public, not only for the present, but also for the future. Fortunately, on the directorate of the company were men who had faith in the solidity and future prosperity of Vancouver, recognizing that, although a young city, it had a situation unequalled on the continent, both geographically and commercially, having a magnificent harbor backed by untold mineral, timber and fishing resources, as well as enormous areas of fine agricultural and fruit lands, and blessed with an exceptionally moderate climate. These factors alone afforded a sufficient guarantee of the speedy growth of the young city, to say nothing about the great transcontinental railways, two of which were already here, while others were preparing their plans for entry into the new business stronghold on the shores of the Pacific.

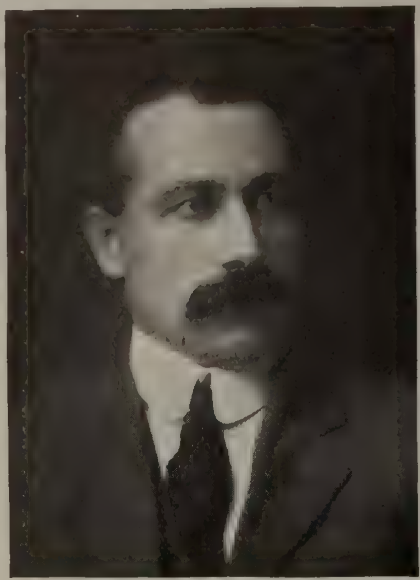
Finishing and moulding department

Realizing these things, and being imbued with the progressive spirit of the West, the directors decided to purchase a larger site and erect thereon a factory which would be modernly equipped, have a capacity large enough to meet all demands for five or ten years to come, and so built as to allow for further expansion in the future. In this factory they planned to manufacture sash, doors, frames, cabinets of every description, bank and office fixtures, mantels, stairwork, pantry fittings, interior and exterior finishings, lumber in soft and hard woods—in fact, everything necessary for the finish of the home, office or apartment building. The consummation of their hopes was reached in July, 1910, the date of the opening of the new plant on Twelfth avenue and Yew street, which they continued to operate until December, 1911, with every department of the factory working at full capacity.

At this time the company met with a severe setback owing to a disastrous fire which swept the main building and boiler house, entailing almost a total loss of machinery and stock, which was only partly covered by insurance. Even this loss did not discourage the firm from rebuilding. Clearly realizing the future possibilities of the woodworking business in a city that is rapidly becoming the Liverpool of Canada, they at once proceeded with the rebuilding and equipping on the old site of a factory almost double the size and capacity of the one destroyed, and in which every department was laid out in such a manner as to reduce the cost of manufacture to the lowest possible point. The plant was equipped with over forty of the latest models of woodworking machines, together with the numerous smaller devices used by cabinet makers, such as patent bench vices, clamps, glue presses, benches, etc. The department devoted to cabinet work, ocupying a floor space of 13,600 square feet, merits special reference in regard to the provision made for light and ventilation. The ceiling has an average height of twenty feet, with about one-third of the wall space in glass. The lower section of the windows runs to within six feet of the floor, the wall space below being available for work benches. Every machine in the building is equipped with a vacuum system for carrying off all the sawdust and shavings and conveying it through large galvanized iron pipes to the boiler room, where the refuse is fed automatically into the furnaces under the boilers, which furnish the power for the plant, including that required for the electric lighting system, the installation being one of the principal features of the factory. The lamps throughout are set in large trough-shaped reflectors, which throw the light downward on the machine or work-bench, as the case may be.

Sash department.

As a protection from fire, the directors have taken a lesson from past experience and have installed the best preventive aids sanctioned by the fire underwriters. In addition to the factory being well isolated from other buildings or exposures, there are eight separate standpipes located in the most convenient positions in the different de-



Mr. H. P. Falls, president and managing director of the Terminal Construction and Manufacturing Company, Limited.

Mr. E. W. Falls, secretary and mill superintendent, Terminal Construction and Manufacturing Company, Limited.

A corner of the rotunda in the Hotel Vancouver Annex. An example of quarter cut oak finish installed by the Terminal Construction & Manufacturing Company, Limited, in the new $2,500,000 hostelry of the Canadian Pacific Railway Company.

partments, each pipe being equipped with standard two-inch hose in fifty and seventy-five feet lengths. In addition the factory has installed the international automatic sprinkling and fire extinguishing apparatus which was installed by Barr & Anderson, of Vancouver. This system is so complete as to cover not only the interior of the main buildings, but also extends to every part of the premises. The boiler house is very roomy and fireproof in every particular, being built of reinforced concrete throughout, with ironclad self-closing door and metal sash with wire glass. The fuel vault, in which is stored the surplus fuel that accumulates during the day, is also of reinforced concrete, and is built above the boiler house. When liberated the fuel drops down a concrete chute which discharges directly in front of the boilers. This storage fuel is used by the night engineer to keep up sufficient steam for the dry kilns. Handled in this way, the sawdust cannot accumulate in large quantities in the boiler room and cause unnecessary fire hazard—it comes down as it is taken away by the stoker. In order to eliminate any possible danger of fire spreading from the dry kilns to the other

A corner of the cabinet department.

buildings, the firm recently erected a reinforced concrete wall twenty-six feet high by sixty-five feet long. This last addition, together with the other fire-fighting appliances not only fully protects the plant from fire, but also reduces the rate of insurance to be paid to the minimum figure.

Since the completion of their present plant, the company have been able to accept orders from and ship their materials to all parts of British Columbia, Alberta and Saskatchewan. Having over 600 feet of railway siding, large storage sheds, ample dry kiln capacity, and a plant second to none in equipment and labor-saving devices, they are in a position to face the keen competition of to-day, either in carload lots of stock, mouldings or finished lumber, or in the supplying under blanket specifications of everything in their line for the completion of even the largest contract.

One other feature which we deem worthy of favorable comment is the fact that the firm employ white labor only in every department of their extensive industry. In excluding the oriental laborer the firm have established a precedent in British Columbia. Their argument in support of this line of action is commercially sound and doubtless it has contributed in no small degree to the growth of their large business. Here it is: "The more skilled and efficient the workman, the better the manufactured article; the better the article, the deeper the smile of the customer. One customer with a smile is worth one hundred with a frown."

Uses of Sawdust and Wood Flour

CERTAIN people in this country have been for some time using comparatively large quantities of wood flour, which is nothing more nor less than sawdust dried and reground. In the past fiscal year there was imported into the United States something more than six million pounds of this wood flour, and this circumstance, together with the fact that the uses of the flour seem to be steadily enlarging, has aroused a lot of interest among sawmill men and other woodworkers and inquiries from them as to where and how sawdust may be marketed, what its uses are, and so on, are not infrequent.

In February, 1911, the consular reports contained a story about wood flour made in Germany or Norway, giving an outline of the process of manufacture—which consists in drying and grinding to a flour. In grinding sawdust to a fine flour some difficulties are met with. It can be ground easily enough on the old millstones, but dry wood being reduced to flour cannot only be easily ignited with a spark, but is likely to explode; so the exercise of considerable diligence is required in the process of reducing to wood uour. It can be done, though, and is being done, but the grinding process should be set apart from the main factory, so that in case of an accidental fire in connection with the work the entire factory will not be endangered.

Last January there was a brief consular report on Norwegian sawdust and wood flour, giving the prices f. o. b. Christiana, Norway. At that time sawdust prices were 30 ore (.04 cents) per hectoliter (2.84 bu.). Wood flour in Norway is sold by the short ton, weighing 1,000 kilos (2,204.6 pounds), and by the long ton, weighing 1,016 kilos (2,239.9 pounds)—the prices ranging about $10.17 to $13.40 per lond ton. The flour paid a freight rate of $5.15 per ton to New York, and insurance of $1 a ton; the certificate of invoice cost $2.50; all of which added considerably to the price by the time the stuff entered into the trade in this country.

The Bureau of Foreign and Domestic Commerce has a list of the Norway manufacturers; but the St. Louis Lumberman point out that it is not what the would-be manufacturer requires. He should ask for a list of American importers. He should also be able, by inquiry through the wood utilization department of the Forest Service, to get a line on uses for wood flour and sawdust.

Another thing that has been commented on before, but perhaps has been forgotten, is the development of the use of sawdust as a material for packing grapes. The Department of Agriculture has experimented for several years with California grapes packed in redwood sawdust, and has found that they keep better and longer in cold storage in that material than when packed in cork. The sawdust from the band saws in the redwood mills is carefully dried and sifted to eliminate the fine dust and the slivers, leaving about fifty per cent. of the original sawdust suitable for use in packing. The hardwood sawdust suitable for use in packing. The hardwood sawdust native to the grape belts all over the country should be equally as good for grape packing as the redwood sawdust except, of course, when there is involved something that

might impart an undesirable flavor to the fruit. Where there is a chance to market some dry sawdust for grape packing, there is a suggestion that this work might be combined with the work of producing and supplying wood flour. The flour dust is not wanted for grape packing, and it is possible that by properly sifting sawdust one may be able to develop markets for the different grades without having to resort to grinding it, which is a work accompanied by more or less danger of fire.

Quite a lot of experimenting has been done in the matter of using sawdust in flooring compositions. Some have to do with a mixture of concrete and sawdust, or sawdust and lime. There was a report from Germany of composition flooring made of sawdust and magnesium chloride. It is evident from the line of experiments that there is not only a possibility of future use here, but it is very probable that sawdust will be used considerably in the future—as it is now to an extent—in the making of some flooring compositions. It offers a chance of relieving the extreme hardness and coldness of cement mixtures.

The Old and the New in Dry Kilns

Contributed by E. U. Kettle.

THE efficient lumber dry kilns of to-day are an evolution through the various experimental stages. The Smoke Kiln, the Bake Oven Kiln, the Blower Kiln, the Condensing Kiln, the Moist-air Kiln and the Humidity-Control Kiln; they all have had a place in indicating steps in the progress of the art, but with the exception of the latter they have taken their places as obsolete equipment; as out of date as the old walking-beam side-wheel steamboat.

Old-fashioned systems of lumber drying are rapidly being replaced by the modern humidity control process, which, if installed in accordance with the scientific principles to which it owes its existence, will successfully overcome all difficulties hitherto experienced by the operator of any of the old types.

Every kiln operator who has attempted to produce No. 1 stock from a Hot-blast or Direct-radiation kiln is well aware that it is utterly impossible to produce stock free from defects, for the simple reason that lumber dried by those methods is dried from the surface inward. This invariably results in case-hardened surfaces from one-sixteenth inch to one-eighth inch thick, with kindred defects such as surface and end checks, interior checking (honeycombing) twisting, warping, excessive and unequal shrinkage, and more particularly with quarter sawn oak "hollow-horning" or cupping.

Every machine operator knows that lumber dried by these methods is hard to work, dulling his saws, knives and tools, and entailing loss of time in cutting out defects. When such stock, having the pores and cells filled with baked residue of sap, acids and organic matter, is manufactured into the finished article, it is probable that sooner or later the results of defective drying will be apparent in the shape of "raised grain" and opening of joints and panels, and although these defects may not be observed by the factory inspector as they are not so obtrusive when the article has just left the hands of the finisher, it is certain that they will come to light after storage for some little time, possibly in the showroom of a customer.

Lumber that is overdried has a tendency to expand and when jointed up will either open up joint in centre of panel or will centre-check. If underdried these defects will be apparent at the ends.

Undoubtedly the manufacturer and operator of the jointer, and the glue and varnish manufacturers are very often the "scapegoats" for the defective design or operation of a lumber drying system. Any manufacturer who still believes in kilns of the type above mentioned will find it to his advantage to follow a kiln car of lumber from the kiln to the finished process, tallying quantities at each step and ascertaining the percentage of loss on the same.

The object of correct lumber drying is obviously the production of stock free from defects, flat, soft and of permanent dimensions. As the moisture content percentage of thoroughly air-dried hardwood lumber is equivalent to as high as fifteen per cent. on bone dry weight, it is useless to reduce this moisture by any artificial process which fails to dissolve and expel the contents of the pores and cells, as the lumber will only suffer further contraction and owing to the taking up of atmospheric moisture, will again expand in ratio to the varying atmospheric conditions to which it is subjected. Experiments have proven that permanency of dimension cannot be obtained by such a process. Regarding width and weight no ordinary kiln dried lumber will remain very long in the same condition in which it was when taken from the kiln. As soon as the artificial heat is removed it will begin to absorb moisture from the atmosphere, absorbing most when the air is moist, and expanding and parting with moisture when the air becomes drier and contracting.

Thus it will be seen the new ideal drying process is one which will keep lumber expanded throughout, besides insuring permanency of dimension by producing lumber which will remain practically uneffected by normal alterations of climate or temperature.

Old-fashioned methods of testing lumber for dryness are out of date. No longer need the manufacturer trust to his senses of sight, smell, feeling, hearing and taste when he can, by a simple scientific method, accurately determine the correct amount of shrinkage and moisture content, and foretell definitely when charging kiln when the lumber will arrive at the condition necessary for the factory requirements.

Recently a test was made of some lumber taken from a dry kiln which was equipped on a sort of "mongrel" system, being a mixture of radiators, steam sprays, etc., a combination which could only have been evolved by someone whose ignorance was paralleled by his temerity in annexing the ideas of others and combining them in one ingloriously inefficient whole. The lumber on leaving the kiln contained only six per cent. moisture, yet after this had been in the factory for twenty-four hours the moisture content was 9.7 per cent. with expansion of three per cent.

This greatly desired permanency of dimension is absolutely assured by the humidity control process provided that the latter is installed in a thoroughly efficient manner. It is futile to suppose that this can be done by anyone who has not made a thorough study of the subject and who is not thoroughly ac-

quainted with the chemistry and fibrous construction of timber, and who is unable carefully to diagnose the diverse and exacting drying requirements of the factory and design the kiln building and equipment in accordance therewith. In an inspection of some progressive dry kilns at the plant of an Ontario manufacturer it was found that although the brick walls were well built, the flimsy frame roofs were neither steam nor air proof. The amount of piping was far in excess of what was necessary, thus using more steam and producing greater heat than was required. Therefore the ingenious (?) designer corrected his error by placing large open stacks in the middle of the roof, and as an afterthought added a steam spray which was ab-

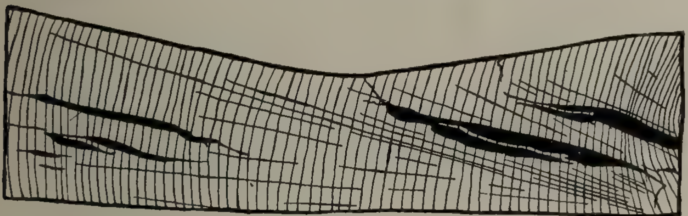


Illustration No. 1.

Cross-section of 2-in. quarter-sawn oak, showing effects of defective drying. Note "cupping" and "honeycombing."

solutely useless because of the leaky building and lack of control of the movement of air. Two cold air flues completed this "chamber of horrors" in which, except by a miracle, no lumber could escape unharmed.

Now if the owners of these kilns had consulted a recognized expert on this matter they would have saved quite half the cost of the installation, and at the same time would have secured quicker and more efficient results in lumber drying. At this plant they were using birch, maple, elm, oak, plain and quarter sawn, and basswood in four by four inch and eight by four inch. Therefore it would have been far more advantageous to them if they had installed a battery of Box kilns of the humidity control type instead of long Progressive kilns for the following reasons:—

First: In a progressive kiln humidity and a low heat must be maintained at the loading end and a high heat and low humidity at the unloading end, with proper intermediate stages. The maintenance of the differences in temperature and humidity has an important bearing on the rapid and safe drying of lumber, in fact it is the most important feature. The shorter the kiln the harder these differences are to maintain and the greater the chance of injuring your lumber. In a box kiln the relative humidity and heat can be easily regulated by the operator throughout the stages of drying without exposing the lumber to that shock that comes from moving it through a progressive kiln or opening and closing a progressive kiln.

Second: A progressive kiln is opened at least once a day to put in wet and take out dry lumber. There is consequent serious loss of heat and humidity which requires at least two or three hours to restore. This produces not only a shock to your lumber from sudden cooling, but a waste of good heat that costs money. In a box kiln the kiln is not opened at all during the drying of a charge of lumber, i.e., seven or eight days, according to conditions, and of course the heat lost by opening doors at such time is obviously negligible.

Third: A box kiln being in smaller units than a longer progressive kiln, offers much better opportunity for separating the thicknesses—age of and kinds of lumber—in such a way that each will be dried quickly and effectively according to its own particular requirements. In other words in a progressive kiln you will often have a car of hard drying or thick lumber in front of a car of easy drying or thin lumber. In this case the easy drying lumber has to remain in the kiln until the thick lumber is dried. As a consequence the easy drying lumber is usually overdried and the hard drying lumber is not left in long enough to be properly dried.

The only process which has proven successful in producing perfectly dried lumber free from defects and of permanent dimension consists of a system of steaming, direct radiation and effective circulation, which eliminates the contents of the pores and sap cells, dissolving all acids and organic matter, and extracting them from the pores of the lumber, leaving only fibre which will not shrink or swell to an appreciable extent after this treatment. This ideal kiln must have the means of controlling humidity, heat and circulation, which are the three important factors of kiln drying and these can only be assured by a kiln built on these scientific lines. Any kiln built without means of obtaining uniform circulation, according to nature's well defined laws will be slow in action, as the speed of evaporation is controlled by the moving air, and as the surface evaporation from a board should not exceed the rate at which the moisture transfuses from the interior to the surface. Drying must be uniform at all points, and this can only be attained by uniform circulation. There is considerable difference between circulating air by gravity and the strong draught generated by a fan.

There are in existence many so-called moist air dry kilns, which are simply the old style direct radiation type plus a steam spray, and with no provision made for the necessary compression and circulation of steam and air, and absolutely without humidity control.

Although the addition of a steam spray will tend towards a diminution of case-hardening under certain conditions, it can only be successful when the steam is brought in contact with every inch of every board in the load. This can only be achieved by the constant

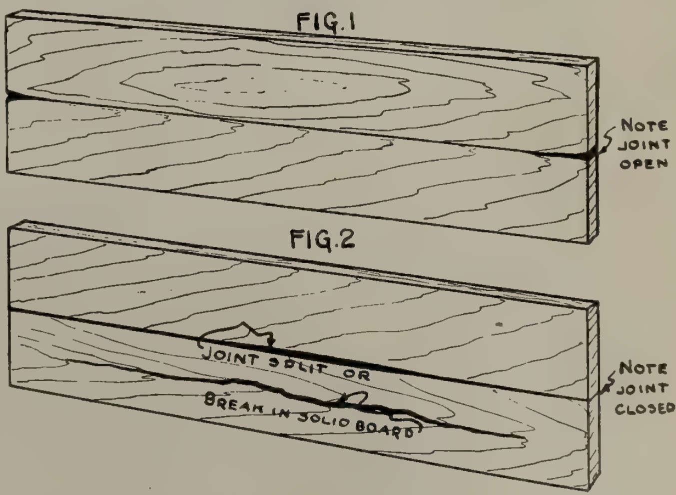


Illustration No. 2.

Fig. 1—Represents what happens when lumber is not dry enough. Notice the joint is broken from 3 to 5 inches at each end. Ends have shrunk.

Fig. 2—Shows what would be likely to happen, and does frequently happen, and it is supposed that the lumber is not dry enough, and it is given another warming up in the kiln, whereas, the real difficulty is the lumber is so very dry that it is absorbing all the moisture from the air and expanding with tremendous force; so much so, that if a ⅛-inch length of grain were cut off across this board 3 or 4 inches from the end, it would immediately jump out beyond the width from whence it was cut —try it—notice the board splits through the joint while the ends remain glued, or there is a break in the solid board nearly its entire length, showing great danger in over-drying.

circulation of the steam under very slight compression. In fact, every cubic foot of air in the kiln must be kept in circulation and must contain varying percentages of humidity—high at the commencement and low at the finish—whilst the heat must be adjusted in inverse ratio. This process may be described as a saturation-sweating-evaporation process, and when a kiln is installed correct in every detail, the lumber will not only be dried in half the time required by any other process but will be free from defects, so far as the action of the kiln is concerned.

The addition of a steam spray and a few flues and stacks can never transform a direct radiation kiln into a kiln capable of performing quick and perfect work. Neither can this process be operated in a flimsy frame building for obvious reasons.

It is satisfactory to note that quite a number of Ontario furniture and piano manufacturers are adopting this new system. Quite recently there has been installed, in Berlin, a battery of three box kilns of this type which are in active operation giving splendid results, having been planned in accordance with factory requirements and installed under the direction of an expert. There are several kilns in Berlin and surrounding districts which have been installed by the same firm of dry kiln engineers whose system has been endorsed by some hundreds of woodworkers throughout

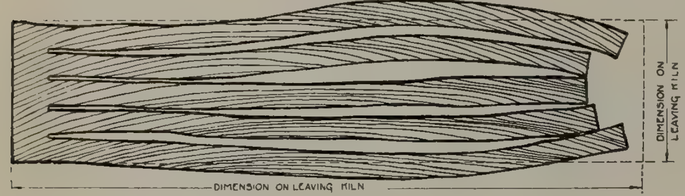


Illustration No. 3.

Cross-section of 2-in. red gum board re-sawn as shown in sketch after leaving kiln and afterwards exposed in factory for a few days at normal temperature, during which period it assumed shape as above, due to absorbing atmospheric moisture, having previously suffered from case-hardening of surfaces.

the United States and Canada and who, according to the "El Paso Mining Journal," have recently built the largest battery of dry kilns in the world at Pearson, Mexico. This outfit consists of twenty-four kilns, each 18 ft. to 24 ft. wide, 134 ft. long and 16 ft. high. They were designed for the purpose of drying 4/4 pine and have proved immensely satisfactory. This proves the adaptability of this system to the drying of any species of wood, provided the equipment is planned scientifically.

In building a dry kiln avoid costly experiments and firmly restrain those employees who wish to exploit their own ideas and theories at the firm's expense. Take the advice of those who know and pay for it willingly. Better to pay the price for a good thing than the penalty for a bad one. It will need very little investigation to convince any fair-minded woodworker that the humidity control dry kiln, properly designed and installed by those who know how, is the only dry kiln worth serious consideration.

Some of the modern planing machines are made with as much uniformity as practical in the bolt heads, so that only a few wrenches are required, and a place is provided to keep these few so that they will always be at hand. The care of the older machines can be facilitated by making the same provision—that is, fitting up the necessary wrenches for the machine, then having a convenient place for them.

Slow-Speed Exhaust Systems

By R. L. Baker.

EVER since the time when the blow pipe people produced "wind pipes" there have been exhaust systems—or, as they are commonly called, blow pipe systems—of various degrees of excellence. It is only within the last decade, however, that the slow-speed system has come into general practice. The name, as applied, is somewhat misleading, but as it has taken a firm root we will not attempt to disrupt it. The origination was with the fan. The old-time system, of which there are a good many still in operation, used a small fan, with corresponding small mains also collector or "cyclone," but with same size branch pipes to the machines. As is well known, the conveying of any solid material with air requires a certain velocity or rate of flow depending on the weight of material, and the product of this velocity and the area of branches gives the amount of air necessary to do the work. With this small fan, etc., it was necessary to run the fan at very high speed in order to get this amount of air. Three factors bear, in different degrees, on the resistance of air flow in pipe, namely, length of pipe, diameter of pipe, and velocity of flow. As already stated, we are trying with the old system to force a large volume of air through small pipes, fan and collector, all of which are piling up resistances on the faithful old fan, all of which goes to show that the adoption of slow-speed fans, piping and collectors, was not a lucky guess but the result of scientific study and investigation. Non-resistance systems would, as a name, be nearer to a correct definition, as it is exactly what we are attempting to get.

In a slow-speed system the same amount of air is handled and in many cases, even more, but it is done through larger mains, fan and collector, with perhaps half the resistance or total pressure. Power necessary to drive air is the product of its weight by the pressure worked against. If we handle a given volume of air against half the old pressure it is easy to see, for example, how the resulting power, which is the big issue in the slow-speed system, is obtained. It is unusual to find a woodworking plant generating power for less than $25 per h.p. a year, but it is not unusual to find a plant that is consuming 100 h.p. on its fans when the same work could be done better for half this amount. It would doubtless be a wise investment for the many fan users to get a common "U" water gauge and make a few simple tests at both sides of the fan and near the collector. By this means some discoveries might occasionally be made. It is well to remember that the reading on discharge of fan is pressure and in large measure waste, which if eliminated or reduced would revert to the suction side and be useful if required.

Steel sash for windows in fire-proof buildings has proved disappointing enough that there is now quite a turning back to wood again. Steel is found to be too cold, as well as uninviting, and there is really nothing that so appeals for sash, doors and interior trim as good wood work.

Fire walls between different departments of the wood-working plant should be kept as solid and intact as possible. No shaft holes or other openings than those for doors should be made, if they can be avoided. The doors should be so hung as to automatically close in case of fire.

Machinery and Equipment

Ball Bearings for Power Transmission

WITHIN the past few years the application of ball bearings to all classes of moving machinery has been general. The necessity of reducing all manufacturing costs to as low a point as possible in order to meet competition has brought prominently to the attention of manufacturers the loss of power that takes place between the engine or motor and the producing machinery. Careful investigation has shown that this amounts to from 15 per cent. to 70 per cent. of the entire power used and this loss is divided between line and counter shaft friction and belt friction. A proper installation of ball bearings will reduce this waste of power to a minimum and will deliver practically all of the power to the producing machinery.

Very few manufacturers to-day doubt that ball bearings applied to shafting will save power. This is self-evident. What the average man wants to know is whether they will stand up under the conditions to be met with in his plant and continue to run satisfactorily for a period of years and thus earn a return on the initial investment necessary to install them. This depends entirely on the design of the bearing, the materials entering into its construction and its load-carrying capacity. In order that the initial cost may be as low as possible the bearing should, whenever practical, conform to present standards—in other words fit the recognized standards of adjustable hanger frames.

Ball bearing manufactured by the Chapman Double Ball Bearing Company.

With the design and materials in a ball bearing of the best, its load-carrying capacity limits its life. A ball bearing of light design with a small carrying capacity will undoubtedly save power for a time, but it will not stand up under the stresses and strains to be encountered in power transmission work, and it is absolutely necessary in order to get satisfactory service for a length of time to have a bearing designed to give an ample safety factory over its theoretical load-carrying capacity. The following is a simple formula for figuring the theoretical load carrying capacity of a ball bearing, when the speed is uniform and the load is constant.

$$L = \frac{K\ d^2 n}{5}$$

Where L equals the load in pounds, d is the diameter of the ball in eighths—that is, if a ball is ¾-in. in diameter then d will equal 6, or if 7-16-in. in diameter d will equal 3.6; n equals the number of balls; K equals a constant depending on the properties of the material, the form of the ball race and the speed of the bearing. The factor 5 takes account of the fact that only part of the balls carry the load. For ball bearings made of high grade material and accurately machined, k has the following approximate values when working under the conditions cited above.

R.P.M.	10	150	300	500	1000	1500
Constant k ..	44	39.6	33	22	16.5	11

In figuring on the carrying capacity of ball bearings for line shaft work, the maximum tension of the belt should be taken, rather than the amount of power being transmitted, as it is well known that belts that are greasy and dirty may be very tight and yet not transmit much power.

In the lubrication of ball bearings, care should be taken that only a lubricant free from acid is used. The best grade of water white petrolatum is strongly recommended for this purpose.

The Chapman Double Ball Bearing Company of Canada, Limited, are the oldest and best known manufacturers of ball bearings for power transmission purposes. They have been producing bearings of this type for ten years and have installed their equipment in over 2,000 of the leading Canadian factories. Within the past two years these bearings have been exported in considerable quantities to the United States in the face of a heavy duty. The Chapman Company have adopted their bearings to loose pulleys, mule stand pulleys, friction clutch pulleys and shop trucks, shaving exhausters, etc. These bearings will fit any of the standard adjustable hangers and are of such substantial construction that they will operate satisfactorily under any condition of load or speed to be met with in transmission service.

Socket Head Screws for Furniture

The P. L. Robertson Manufacturing Company of Milton, Ont., are making a patented wood screw which is practically adapted to the needs of all furniture workers. The device is known as the Robertson socket head wood screw, and its utility should certainly make a definite appeal to the trade. Instead of a slit across the top of the screw for the reception of the driver, there is a square hole or socket sunk in the top into which fits a specially designed screw driver, which remains there until its work is done, thereby eliminating all chance of slipping. By the use of this screw and driver the screw is driven home with the least exertion, and the driver will not slip and cut the fingers or disfigure costly furniture. Another feature possessed by this screw is that no ragged slits appear afterwards. There is thus a saving of time, labor, money and material. The drivers come in various styles, a sample being awarded with first orders.

An Efficient Portable Grinder

The Hamilton-Beach Portable Electric Grinder has been brought to a very high state of perfection with the result that it has proved itself an invaluable machine for grinding dies, reamers, cutters, etc., and it is a matter for surprise if this machine has not already found its way into the great majority of up-to-date machine shops in Canada. The well-known H-B grinder has been perfected after years of careful experiment and testing, every detail of its construction having been worked out to the finest degree. A special feature of this grinder is the dust-proof bearing caps which prevent grit or dirt coming in contact with the high-speed, nickel babbitt bearings. Weighing about five and a-half pounds it is one of the lightest and most convenient electric grinders

Heavy 4-side moulder on base manufactured by the Preston Woodworking Machinery Company, Limited, Preston, Ont.

ever manufactured. The armature shaft is ground on centres to a mirror finish assuring the greatest accuracy. The motor being air-cooled is proof against excessive heat from overload. The manufacturers, whose headquarters are at Racine, Wis., claim that the H-B is the only grinder on the market that gives the wheel the right surface speed. In buying a grinder one of the most important points to be considered is the motor which not only must be efficient but also must have sufficient reserve power. The motor in the H-B grinder is scientifically designed, all parts being made and assembled under the supervision of skilled mechanics. The machine has made a reputation for speed, reliability, accuracy and economy. In this connection it is interesting to know that the motor in the H-B grinder is universal, operating from any electric light socket on both direct and alternating current. Mr. R. E. T. Pringle, Tyrrel Building, King Street East, is the firm's Canadian agent.

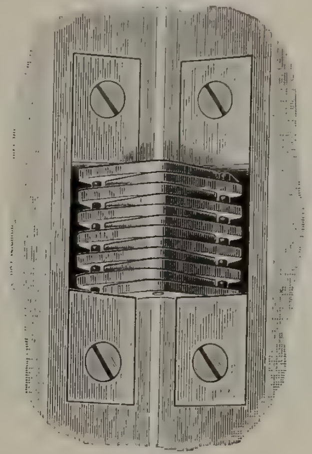
The "Preston" Heavy Four-Side Moulder on Base

Among the recent developments in woodworking machinery is a new moulder (10-in. and 12-in.), completed a few months ago by the Preston Woodworking Machinery Company, Limited, of Preston, Ont., an illustration of which appears herewith. In designing this machine the main idea has been to embody all known improvements calculated to increase the efficiency and durability of a moulder. Distinctive features about the machine which will doubtless appeal to all users of moulders and which are worthy of mention are:—1, Hess-Bright ball bearings for end thrust on side heads; 2, genuine Whitney self-lubricating bearings used throughout the machine, including side heads; 3, all adjustments made from working side without wrenches; 4, ratchet adjustment for raising and lowering side heads; 5, heaviest moulder of the kind made to-day; 6, large clearance for special knives; 7, feed rolls, 7-in. in diameter; 8, top cylinder adjusted back and forth from front by hand wheel and screw; 9, feed can be started from any of the four corners of the machine.

The Preston Woodworking Machinery Company have been manufacturing for about three years and have now a fairly complete line of woodworking machines. Each machine is modern and complete and it is satisfactory to mention that the company's business is increasing as the quality of their machines becomes known throughout the trade.

The Soss Invisible Hinge

The Soss Invisible Hinge Company, Limited, 104 Bathurst Street, Toronto, issue an illustrated pamphlet describing a device which is as simple as it is ingenious, whereby a door can be hung while at the same time quite concealing the hinges. For centuries we have taken it for granted that it is necessary to disfigure our doors and mutilate the frames with butt hinges, but with the appearance of the Soss Invisible Hinge this is no longer necessary. In addition to possessing all the good qualities of the old-fashioned hinge, it will carry



Soss invisible hinge.

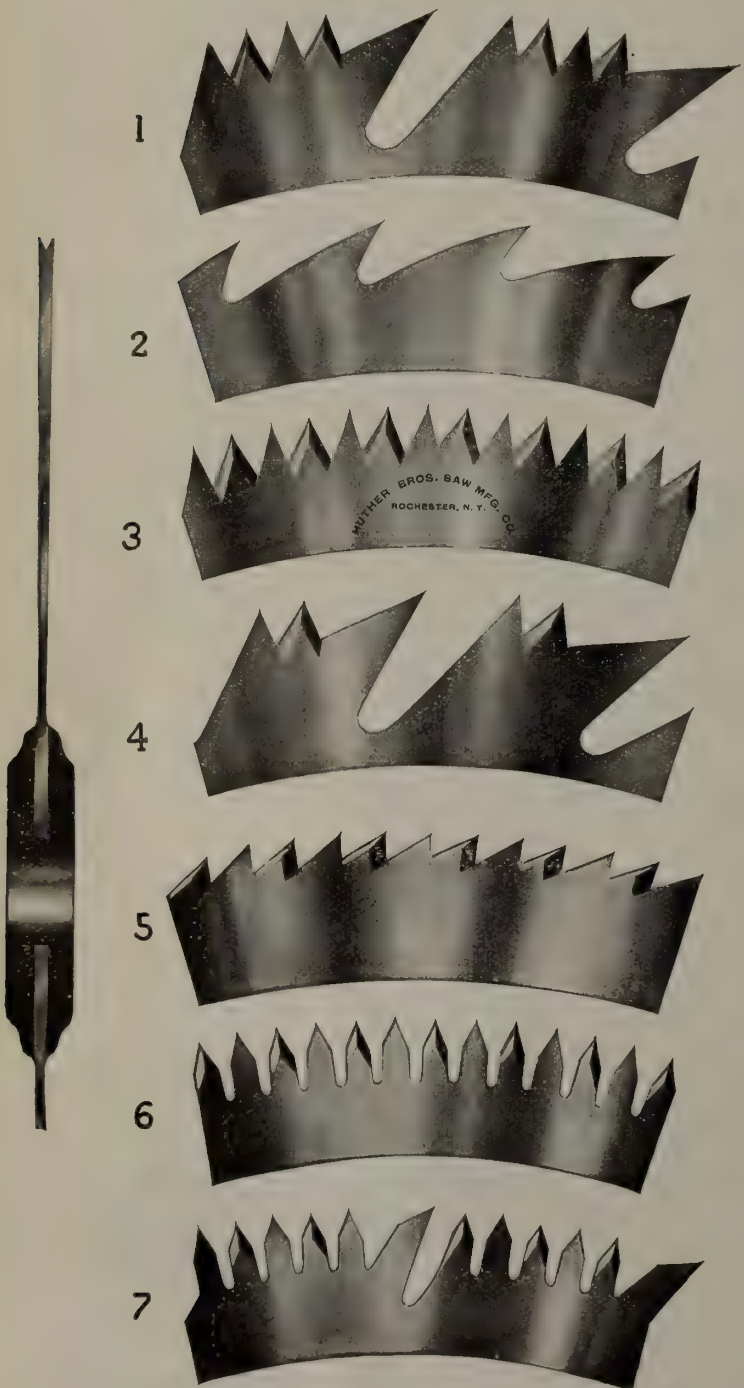
any size door up to one thousand pounds, the working parts being made of frictionless metal which is claimed to outweigh the door. This hinge is adapted to all manner of openings, from jewel case covers to bronze entrance doors.

New Pattern Tenoner

The tenoner illustrated herewith is a new design, recently produced by the Canada Machinery Corporation, which facilitates quick and easy operation. The carriage is provided with combination roller movement, making it easy to push the table and stock past the cutter heads. Two stop gauges are provided in longitudinal slots on the face of the table. The stops are so designed that they can be depressed below the surface of the table, thus admitting of the two being set at once, one for the end of the board and the other for the tenon already cut. A fence is provided on the table which can be angled in either direction and the hold down is ar-

Tenoner of new design made by the Canada Machinery Corporation

ranged to securely hold the stock regardless of the angle to which the fence is set. Stationary feed instop is provided on a bracket attached to the base for regulating the depth of the tenon on the first end. The heads are of new pattern, carefully balanced to insure satisfactory operation at high speed. Spindles revolve in special babbitted bearings of improved design. These bearings are of the side clamped reservoir type, easily aligned and adjusted. The heads are raised and lowered by means of square thread screws on planed "V" ways, to which they are carefully gibbed. A unique feature of this machine is that while the heads can be raised and lowered independently they can be moved together without changing the thickness of the tenon. A shaving hood arranged for attachment to suction pipe is supplied on the top head. The belt tightener is a simple device operated by means of a weight. Provision has been made in the design for the attachment of a cut-off saw. The machine can be furnished without copes, with single cope, or with double copes, as desired. The cut-off saw can be supplied with any of the above arrangements. The Canada Machinery Corporation have had this machine on the market for a very limited time, but over twenty are in successful operation in various woodworking plants in Canada.



Regular teeth for Huther Bros. hollow or concave ground saws.

Huther Brothers Company, Rochester New York

Rochester, New York, has a reputation throughout the world for the excellence and superior quality of the products of her mills and factories. Especially is this true of the saws and cutters manufactured by Huther Brothers Saw Manufacturing Company established in 1880 and incorporated in 1906. This company manufactures an extensive line of circular, band and milling saws, and makes a specialty of patent dados or grooving saws, lock corner box cutters, box board matcher cutters, smooth cutting circular mitre saws and a superior quality of band saws. These saws are manufactured under the supervision of experts, by skilled workmen who have at their command modern tools, a new and commodious plant, and the highest quality of special grades of steel, selected after years of experimenting, for its toughness and hardening qualities. Being made from the highest quality of circular saw steel and finished as near perfection as possible, there is no better quality of circular saws manufactured than those made by Huther Bros. Every saw is guaranteed to have an even and a tough temper, to be true and straight, to be ground accurately to the thousandth part of an inch and finished in the best possible style. Aside from the above-mentioned saws, are made a full line of edger saws, planer and sticker knives, circular knives and milling saws, also special saws for panel raising, heading, cutting and grooving metal, etc. Their plant and offices are located at 1190 University Avenue, Rochester, N.Y.

Snider Brothers, upholsterers, Waterloo, Ont., have found it necessary to erect a large addition to their present factory. The extension will be of white brick construction, 80 x 100, and two storeys high. The foundation has been completed already and it is hoped that the addition will be completed by February 1st. The cost of the addition will be about $15,000.

With the right to manufacture and deal in sash, doors, moldings, casings and finished lumber products, the Bridgeport Lumber Company, Limited, has been incorporated at Vancouver, B.C., with a capital stock of $250,000.

The Dominion Ironbound box factory, owned by William Rutherford & Sons Company, Montreal, has been damaged by fire, which originated in the rear of the paint shop under the lumber storeroom and shavings conductor of the firm's sawmill and sash and door factory.

The new Classic furniture factory, Stratford, Ont., has commenced operations. A staff of about eighteen employees are busy getting out samples. Mr. S. E. Saunders is the superintendent of the plant and Mr. Julian Davies the manager. The company will manufacture high-class bedroom furniture.

The annual meeting of the shareholders of the Danville Chair & Specialty Company, Limited, was held on November 20th and the financial report of the year's business submitted by the Secretary, Mr. J. E. Guilmette, was accepted without discussion. The following were elected directors: A. Chagnon, W. N. Paul, H. Girard, A. C. Miquelon, L. Honnan, Jos. Lepine and J. E. Guilmette.

THE FINISHING ROOM

The Chemist and the Manufacturer

Contributed by Walter K. Schmidt

THE enormous progress and changes which have taken place in industry and commerce in the course of the past century may be justly attributed, to a large extent, to the work of the chemists. This is a statement made by Hervey J. Skinner, of Boston. When it was made the reader did not realize to what extent this particular assertion affected his own manufacturing business. A statement of this kind is usually passed over by the reader with little thought or consideration—put down by him as one of the advanced assertions, but without consideration. We of today are such a busy lot, so busy with our own affairs that we haven't time to realize that which is going on about us. Without enumerating the many advances made in the commercial world which can be justly attributed to the research laboratory of the chemist, the few that particularly interest the manufacturer of furniture and other materials made of wood must find space in this brief article.

The chemist has given this industry a substitute for turpentine, a distillate which has practically all the qualities with the exception of the odour and resinous matter, both of them easily supplied. In the same category are benzole, heavy naphtha, xylol, acetone and several other solvents which are used in the manufacture of varnishes and stains.

Chemistry has given us cellulose and celluloid. It has given us artificial silk and smokeless powder. It has revolutionized the extraction of ores, doing it by purely chemical processes. Alloy and tool steels are direct results of chemical research, but that which is probably of the most importance to the furniture industry is the discovery of Perkin, for through him the use of aniline colors have been made possible, have given the manufacturer more brilliant and permanent colors; colors of a definite strength; colors upon whose existence formulas can be built, producing uniform shades. The manufacture of over two thousand artificial dye stuffs have followed this one chemist's discovery. It is estimated that seven hundred and fifty million dollars are invested in this one industry. It has further given to the producers of coal tar a valuable outlet for waste products which heretofore have been comparatively useless. It cannot help but be of interest for the laity to know that these by-products are shipped to Europe and come back to us as dye stuffs, as oil of rose, oil of mustard, wintergreen, and sassafras, also in drugs such as Phenacetine, Acetinilid and hundreds of others that are now in use by the practitioner. This is sufficient to give an insight into what the chemist does for industry. But chemistry is used but little by the manufacturer, because the manufacturer deals with the modification of material. Since all material is subject to chemical laws and its properties thus governed it becomes apparent that the majority of the manufacturers' problems are those of applied chemistry. Chemistry has been regarded as something to do with drugs and chemicals, and consequently of no help to the manufacturer in his own problems. In the past the manufacturer started as a factory hand and worked himself up to managership and then ownership. Their methods were rule-of-thumb; science had no meaning. Their aim was to make money and efficiency had yet to be considered, but the technical man is slowly making his presence known. Competition gives him recognition, and it manifests itself in the finishing department first. The requirements of the trade in this department make themselves known through the pocket-book. When the boss realizes that a similar line is selling more cheaply he begins to sit up and take notice. Right then and there is the first step for the introduction of more scientific methods, cutting out antiquated processes, obtaining results at a lower cost, producing better work with better finish, and in less time.

In this way we arrive at the point where the foreman finisher must begin to realize that his position is fast becoming one of more importance and one that will require more technical knowledge than ever before. I sincerely believe that the time is upon us when there will be an entire revolution of the finishing department. Modern ways of sanding the wood preparatory for finishing, the new way of preparing colors, applying stains, shellac and first coater with spraying machines and drying varnish in varnish kilns are the most prominent changes that are taking place in the up-to-date manufacturing plant of today.

One of the trials of the foreman finisher is the matching of odd shades out of his regular line of work. The requirements are becoming more and more exacting and it brings him face to face with the fact that he must know and thoroughly understand the materials at his disposal. He must be able to manipulate them so as to give him results equal to those obtained by his competitor.

It behoves him to keep abreast with the times, for he does not know at what moment he may be called upon to turn out an entire line to match that of another factory. The old custom of having a lot of pet formulas and guarding them with secrecy has made the finisher rather a dependent creature, whereas he should be an independent personage—able to meet the requirements of his vocation by relying upon his own knowledge.

The one who selects the Finishing Room as his place in life and who will make a success and rise beyond the mediocre position is the young man who fortifies himself with a fair education and at least the preliminary courses in chemistry. Woods are becoming scarcer. We can rely no longer upon the selecting of woods to produce beautiful effects; the artificial, the substitute, has to be reckoned with and there is where a thorough knowledge will give its own reward.

The foreman finisher must know and be able to have in his mind's eye the colors of the period. He must know how to produce Hepplewhite, Chippendale,

Adams or Jacobean. He should be able to produce the color correctly and the finishes according to their period—yes, and still more, he must modernize it to our present conventionalities. He must be able to take a piece of furniture made up of solid mahogany, some crouch veneer, bay wood and gum wood, and turn it over to the salesroom with such a uniformity of appearance that the designer can hardly distinguish between the woods.

The dearth of information on these subjects has been recognized by some of the trade papers and many good articles have been published. Some ambitious authors have published books which are mostly compilations and collections of receipts and formulas and methods that are not even fit for the house painter of today. Their formulas all leave too many loop-holes. They are not definite or concise, and the unfortunate one who attempts to follow them has no way of knowing whether the results he obtains are correct.

The schools of technology of today are floundering. The men who are teaching have a fair idea, but they do not know why; they simply know that some one told them to use a little of that, so much of this, and then do that, and that the results are supposed to be a certain finish. The remedy is practical experience, a continued outlook for everything that is published pertaining to finishing. When an article appears recommending certain things, try it, buy a small quantity, find out for yourself what you can do with it. In a short time you will know what the results are and why and how you obtained them. Keep accurate memoranda of your experiments and in a short time you will have accumulated a considerable information which will be the foundation of that qualification of Knowing What and Why you are doing. These are the stepping stones for the finisher. He can augment his knowledge by a judicious use of the reference libraries. In most cities the trade papers are kept on file. New things and new methods are coming so fast that by simply keeping abreast of the times the institution which you are serving will, through your ambitions, be able to cope with any competition.

Useful Service from the Varnish Manufacturer*

IN the history of the manufacturing of varnish we find that even up to twenty years ago varnishes were almost universally made from linseed oil and fossil gum. The proportion of oil to gum determined the suitability of the particular varnish for use by the furniture manufacturer; by varying the treatment of the oil, selecting the gum and different meltings of same, the manufacturer was able to control color and drying of varnishes, together with their rubbing and polishing qualities. In those days the lasting quality of the finish was of first importance—the time required to obtain the suitable finish was not considered. If the first coat did not dry properly in seven days it was given ten, and it was not unusual to allow one hundred to one hundred and twenty-five days for the finishing of a piano case. Today this same work is done in twenty to thirty days.

Anyone having opportunity to compare the finish of a piano or a piece of black walnut furniture finished twenty-five or thirty years ago, with finish on a similar article made within the last three or four years, will find that the finish on the old piece, while it may have some shrinkage cracks, will show a finish which stands out better, and has not shrunk into the pores as our modern finishes have done. Unfortunately today appearance for the purpose of a quick sale is often the first consideration, lasting quality being kept in the background. To a large extent these circumstances have been forced upon the manufacturer owing to change in market conditions. The quality of materials used in finishing are not as good, the time allowed for finishing has been materially reduced, and the prices paid to the varnish manufacture are getting lower and lower each year.

These changed conditions have brought entirely new raw materials into the market so that today most varnishes used by the furniture manufacturers are made to dry over night, and rub in forty-eight hours, and have not the same lasting qualities as those of twenty-five years ago. The varnish manufacturer cannot change these economic conditions, but the up-to-date firm can and does offer to the furniture manufacturer a service which is of great value. In the past it was usually the custom to keep from the varnish manufacturer all knowledge as to the kind of work on which his materials were used and to the method of applying same. If something went wrong in the finish this caused endless dissatisfaction and disagreement, so that today the up-to-date varnish manufacturer has a completely equipped laboratory which proves just what can be accomplished and how economically.

Manufacturers Co-operate

The progressive furniture manufacturers of today when looking for a new finish, do not simply state to the varnish manufacturer "We want a varnish to dry to rub in eighteen hours," but they co-operate with the manufacturer, giving him information as to how this varnish is to be used, kind of wood, kind of stain and filler used, advises whether the varnish must come ready for use or whether he wishes to add some reduction, and if it is to be reduced, the reducing agent he will use. With this information at hand, the varnish manufacturer will probably ask the kind of wood, whether it is straight or quarter-sawed, whether it has been properly selected for color, properly sanded with uniform grade of sandpaper, the methods of staining, filling, varnishing, with time allowed between coats in each case. All this information is necessary in order to give the most satisfactory finish. Sometimes different woods are used in the same piece of furniture but it is not always known that the same stain will not show the same color on the different woods, nor will the filler. Then often the pieces are not uniformly sanded and the stain will strike deeper on one piece than the other. One manufacturer who does considerable work for the government specifies whenever ordering woodfiller for oak, one filler to go on quartered oak, another filler to give the same shade when used on straight oak. This is the correct practice. The same filler used in the same way on quartered oak, straight oak, ash, and chestnut will give four different effects. The same mahogany stain used in the same way on genuine mahogany, Philip-

* Contributed by Mr. Carl J. Schumann, of the Moller & Schumann Company, Brooklyn, N. Y.

pine mahogany, birch, white wood, and maple will give a different effect in each case.

A New Stain Needed

Recently a certain manufacturer wished to substitute Philippine mahogany for the genuine—he could not get the same shade of finish so he submitted a few stained pieces of wood to the manufacturer and asked for a suitable filler to make the finish same as on the genuine mahogany. It did not take the manufacturer long to find that the fault was with the stain, and what this man really needed was a new stain after which the same filler would answer. This solution was only possible by giving the manufacture of the stain the necessary information to work with. Formerly nearly all varnishing work was done by brushing, although some few parts were dipped. Today with this service department, the varnish manufacturer can recommend to the furniture man the method of applying materials which would be most satisfactory for the particular work. By seeing a picture of the piece or the actual article itself, the varnish manufacturer can recommend whether it should be coated by dipping, brushing, or spraying. In some cases where the article is all assembled before finishing, it can only be done by brushing. Where certain parts are finished before assembling, they can be more economically finished by dipping or by spraying, and the cost of finishing the entire article materially reduced. A recent test made on a table top about three feet by nine feet indicated that when standing in a vertical position, a finish which was much better could be obtained with one coat of varnish sprayed in less than half the time taken to apply one coat by the old method of brushing.

The varnish manufacturer of today is in a position not only to supply the necessary materials, but to standardize the entire method of finishing. In his laboratory he determines in a small way the exact method best suited to your conditions, and tells you how to apply it in your own factory. He is ready to advise you on one point or on an entire system; he supplies to the finishing department just such methods which the machinery manufacturer has for years supplied to the cabinet department.

The National Process Company of Indianapolis are makers of the now famous Atlas glue, which appears from results to be just what veneer men have been after for years. This glue has recently been installed in one of the largest European woodworking factories, near Paris, where it is giving excellent results. This firm, it may be mentioned, use about 1,200 pounds of dry glue daily, a fact which is a further testimony to the excellent qualities of the product. The preparation is also used by the American Compound Door Company, Chicago, in the manufacture of large five-ply flush compound doors and by the Greencastle Cabinet Company of Indiana, who in a letter to the manufacturers as recently as November 20 state that Atlas glue has improved their results and reduced the glue consumption considerably. It has also increased the capacity of their trucks and retaining clamps.

Views taken in the laboratory of Messrs. Moller & Schumann, showing spray brushes and drying system.

The Origin and Characteristics of Vegetable Glue

SEVERAL years ago Frank G. Perkins was the chief local representative of a company which established an extensive plant in Florida for the purpose of manufacturing various products from the cassava plant. Cassava is a highly ornamental tropical plant; its leaves resemble those of the castor bean and its root (the part of commercial value) is like a mammoth, elongated sweet potato. It requires eleven months to mature.

But adverse conditions arose, and the original purpose of Mr. Perkins' factory had to be abandoned. What could be done with the investment? Mr. Perkins had been so bothered by the sticking of the cassava to the machinery in the process of manufacture that he conceived the idea of finding out if the "sticker couldn't be made to stick" and a wood glue produced by suitable treatment, which could be used for gluing up veneers, etc. He conceived that a glue equal, and in some respects superior, to the best animal glue could be produced, a material that would produce a sort of artificial wood joint between the wooden surfaces. After much experiment he made some mixtures that could really be considered vegetable glue, but from them he could only draw little threads of his mixtures out the distance between the thumb and finger, and the joints made with wooden pieces gave excellent promise, but were unsatisfactory. He finally discovered that it was possible by certain conditions of preparation to make mixtures, the adhesive hairs from which extended to a few and finally a number of feet.

So vegetable wood glue was first discovered and invented by Mr. Perkins in Florida a number of years ago, under the stimulus of a factory threatened with

idleness, and a new industry was born. While this was interesting so far, it was a long way from the present commercial glue, which he finally worked out with long and careful experimenting.

Then came the stern necessity of meeting commercial requirements and overcoming "practical" skepticism. The new wood glue was tested by one or two veneer concerns for a long time, its qualities perfected to suit commercial requirements, and the users much pleased with the final results. Its sale was then slowly extended, until after a number of years, a most successful business, capitalized at nearly half a million dollars, has developed in its manufacture, and many woodworking plants are now using it. The manufacture and use are protected by patents in the United States, Canada and European countries.

Perkins' glue is said to be especially adapted for built-up stock and veneer laying, replacing high-grade animal glues. Many of the largest glue consumers in in the country have for these purposes used it exclusively for a number of years.

Among the advantages its users claim for it are absence of odor and the absence of heat in application. Of more practical interest to glue users is the fact that it does not sour by standing and so cause waste; and this, with a greater covering capacity, leads, they state, to a saving of 15 to 20 per cent. over the former hide glue costs. At the same time very satisfactory results can be obtained; for, like some other things of general consumption, the joint is said to "improve with age;" and, once it is made, no amount of heat, short of burning, will separate it. This last named quality absolutely does away with "blisters," if the glue is properly applied. The users of Perkins glue also find that the product runs absolutely uniform; that they never know when they go from one shipment to the next. Thus, with care in manufacturing, the processes can be controlled more accurately than even the consumers' conditions of use and the stock to which it is applied. It is claimed that every batch is brought to a specific standard in the making; and, when finished, critically examined and subjected to actual trial before stocking for shipment. So it is not altogether surprising that, since better shipping facilities required the factory to be moved north to Lansdale, Pa., where ample room for further expansion was acquired, it has already been necessary to increase the capacity several times.

We believe the late Friman Kahrs, the well-known glue expert, was correct in stating (Glue, volume 1, page 14, October, 1910) that, "Take, for instance, veneering. Animal glue is there, the old standby, thought to be the glue—the only glue—until Perkins showed what the vegetable adhesives could do." He evidently had the future demands of the wood industry in mind. It is a well-established fact that decreasing cattle herds have caused a shortage in the raw material from which animal glue is made. As the ranges are settled, this shortage will become much greater. On the other hand, the price of lumber has compelled a tremendous consumption of veneers and other built-up stock, and their many advantages, beside that of economy, insure an increased demand for built-up stock, and so for glue. Some substitute for animal glue was a necessity, and it may be that the invention of Perkins is destined to influence largely the future use of veneers.

Veneers and Panels

Care and Handling of Veneers

Contributed By A. J. Mitchell

PASSING from a consideration of the handling and care of lumber, discussed in the November issue of the Canadian Woodworker, we come to the care and handling of veneers. Herein we have a most important subject, and, incidentally, one which discloses not infrequently one of the largest leaks in the factory. In no other department can dollars disappear more quickly and less observed than in the veneer department. How often do we go through furniture factories and find the veneer piled away in some remote place which provides altogether inadequate storage! The veneer men are obliged to walk over perhaps a dozen flitches in order to get at the one they require and if this occurs a few times the two or three top slices and several of the flitches are practically worthless. Where oak, satin walnut or mahogany is used each piece destroyed in this manner means a loss of from ten cents to one dollar. Perhaps the ends of the flitches project into some passageway, with the result that one of the hands coming along with a truck treads on the ends of one or two flitches a few times and destroys about a foot of the material, which means a loss of not less than one hundred feet. How often does this occur during the year? Again, perhaps when the veneer is received into the factory crates are removed and the stock is stored in a place which is too dry for storing purposes and the flitches being loose the edges of the veneer become crimped up so that jointing is impossible without ripping off two or three inches the full length of the flitch. Consider the waste from even one flitch, say, twelve feet long and with sixty pieces. The loss occasioned by having to rip off three inches from the edges would be about 180 feet of veneer—and that is only one flitch out of many during the year.

Now if the logs from which the veneer is cut have been properly boiled, cut and dried, the veneer should not be stored in a room too warm and dry, for it should not be cut up in the bone dry state any more than lumber; in fact all woods used in the manufacture of furniture should contain one-eighth per cent. moisture when brought into the factory to be cut up and used. It may be objected that if the veneer is not bone dry the joints will open up in the course of drying after being removed from the presses. In my experience, however, it is not so much the fault of the veneer not being dry as its being green owing to the improper boiling of the log from which the veneer was cut. That is the cause of so much loss by open joints, for if the logs have not been properly boiled or vatted the wood remains green and contains acid which should have been forced out in the process of steaming or boiling. If the veneer mill gets behind in filling orders the cutters are liable to pay inadequate attention to some particular logs which should remain in the vats longer or which perhaps should be boiled in a higher temperature than other logs. In the course of a week's cutting there may be many logs which require extra attention, but the cutters are too busy. As a consequence, quite unknown to us, some flitches are greener than others and when the joints open up we are liable to say that the material is wet. Taking as an example satin walnut or critch mahogany, I have found that the better the veneer, or the higher the grade, the more reason there will be for sponging the outside of the veneer just before spreading the glue on the inside, in order to straighten out the buckles or pockets which have formed from being too dry. If these buckles or pockets were left in the veneer and the batch were in the press and we were to give it the regular pressure these pockets would contain so much air that we should be unable to give it sufficient pressure to force the air out of the pockets; consequently when we went to unload the presses in the hope of finding a nice job we should discover several blisters. By sponging the veneer on the outside just before spreading the glue on the other side it is made moist or limp and straightens out of its own accord and there will be no blisters if everything else is alright. By giving crotch mahogany a coat of sizing (shellac and glue) immediately after unloading the presses and filling the cracks and holes with litherage, colored with ochre as desired, there will not be much trouble with blisters or open joinings. The sizing should remain on as long as possible, or until the stock is thoroughly dry, so as to protect it from the atmosphere and have the goods coated in the finishing department as soon as possible after the sizing is cleaned off.

From the above observations we may conclude that veneer should be kept in a basement, or in a shed on the ground floor, perhaps two or three feet above the ground, where, if it has been properly seasoned and dried, it will absorb its own moisture from the atmosphere. When the veneer is received into the factory it should be carefully inspected. If it is in the green state it should be stored away until it is well seasoned just as in the case of lumber. If it is not in good condition and dry it should be piled on tables or racks in such a way that veneer men can get at any part of the stock without climbing over the greater portion of it.

The veneer man has to contend with a great many difficulties, but does he try to educate himself in his specialty by taking a leaf out of the experience of a brother veneer man who may have come across the same problem that is worrying him? I feel sure that it would effect a considerable saving in money for the employer—and a considerable saving in worry for the employee—if there were a more general disposition to look for educative material appertaining to the manufacture of veneer. If I were asked how we were to acquire such education outside of our own hard experience, I would suggest, as one of the best methods, the interchange of opinions and experience through the Canadian Woodworker.

If you listen to the beltmakers, every kind of a belt is the best, and every time one goes wrong it is the fault of the man using it.

Preparation of Veneers

A good deal of useful information concerning the preparation of veneers is given in an article on this subject which appears in the Furniture Worker. Commencing with a description of veneer as very thin lumber, the cutting into flitches of the logs, which in turn are sawed into thin sections called sawed veneer, the writer proceeds to point out that the rotary cut process is more extensively used than either sawed or sliced veneer work, the structure of the wood, the size of the logs, and the use for which the veneer is designed largely determining the process employed.

The article proceeds:—Some foreign woods are very hard and, like some domestic woods—the conifers, for instance—often produce the best veneer when sawed, while for other woods the slicing method is preferred. Where the product is for fine exterior finish and has to be selected and matched according to the figure or grain, sawing is the favorite method. Together these two processes were employed to make approximately two-thirds of the white oak product and about one-half of that from mahogany and other foreign woods, but only about one-eighth of the output from domestic woods. The remainder was manufactured by the rotary cut process. This method is similar in principle to the slicing process. The log after being steamed is revolved against a fixed knife the length of the log, and wide sheets are shaved off. Though the domestic and cheap veneers are generally made by this method, the fact must not be lost sight of that, except in the case of oak veneer, the rotary-cut process was used equally with the other two methods for cutting ornamental veneer from both foreign and domestic woods.

Veneer statistics are not shown by figures of production, as are the reports for the lumber cut and for the manufacture of slack and tight cooperage stock, but are given in terms of consumption of raw material expressed in feet, log scale. Veneers are cut into a number of thicknesses. The domestic woods, rotary cut, range from five-sixteenths to one-fiftieth of an inch, and the imported woods from three-sixteenths to one thirty-fourth. The three-sixteenths is the most popular size, followed by one-eighth, one-fourth, one-sixteenth, five-sixteenths and one-twentieth. In the sawed and sliced products the thickest veneer is five-sixteenths and the thinnest usually one one-hundred-and-tenth inch. The thicknesses most used are one-twentieth, one-sixteenth, five-sixteenths, one-fourth and one-thirtieth, in the order named. With such a wide range of thicknesses it would be impracticable to gather the figures in surface measure and undertake to reduce them to board measure, while if production were shown by superficial contents, as in commerce, the figures would not be comparable with the reports on other forest products.

The future promises an extensive growth of this industry. Sheets of veneer and the gluepot are likely to play an even more considerable part in forest utilization. Built-up lumber, consisting of several layers of veneer glued together, is becoming a more important factor each year in the manufacture of a number of staple commodities. Furniture tops, panels and backs, drawer fronts and bottoms, chairs, including bodies; finish of passenger cars, etc., are examples. This product has the requisite strength, is lighter than lumber, is less likely to warp or check, and probably is less expensive, inasmuch as the cheaper woods are utilized for the larger portion of its manufacture.

Cost and Waste in Panel Making

By Van

It seems to be a difficult thing to secure a correct and reliable cost system for the manufacture of panels. There is such a variety of sizes and combinations of different woods, constructions, etc., during the year's business, that it seems impossible to arrive at a correct basis to estimate the cost of any one order.

We have some systems that are seemingly simple and some that are altogether too elaborate. If we apply either to ascertain the cost of similar orders at different periods of manufacture, the cost seems to vary so that the efficiency of either is doubtful. If we estimate our cost on the average amount manufactured, we either make a good profit on the easy orders and lose on the difficult ones, or we lose the easy work because our estimate of cost is too high, and secure the difficult work because our price is too low, or below that of our competitor, other things being equal.

Following is a list of the different woods used during a period of six months, and the percentage of loss sustained in working the stock up for panels:

Thickness in Inches	Percentage of Loss.	Thickness in Inches	Percentage of Loss.
1/20 ash	29	1/30 mbahogany	22
1/16 ash	35	1/24 mahogany	31
1/8 ash	30	1/20 mahogany	21
1/20 basswood	18	1/16 mahogany	23
1/16 basswood	21	1/30 maple	36
1/12 basswood	22	1/20 maple	30
1/10 basswood	20	1/16 maple	21
1/8 basswood	38	1/8 maple	37
3/16 basswood	38	3/16 maple	37
1/4 basswood	40	1/4 maple	35
5/16 basswood	34	1/20 plain red oak	40
1/30 birch	20	1/16 plain red oak	37
1/24 birch	38	1/8 plain red oak	45
1/20 birch	37	1/20 plain white oak	37
1/16 birch	40	1/16 plain white oak	36
1/8 birch	34	1/8 plain white oak	40
1/16 elm	28	1/20 quartered white oak	44
1/8 elm	50	1/16 quartered white oak	45
1/4 elm	45	1/28 walnut	28
3/16 elm	44	1/20 walnut	29
5/16 elm	40	1/16 walnut	32
1/20 gum	30	1/20 whitewood	28
1/16 gum	28	1/16 whitewood	24
1/8 gum	31	1/8 whitewood	30
5/32 gum	47	5/32 whitewood	66
3/16 gum	37	3/16 whitewood	47
1/4 gum	42	1/4 whitewood	54

The greater part of this material was log-run, 6 to 36-in. wide, 5, 6 and 7-ft. long, cut to sizes needed with saws and clippers. We had but little waste at machines when stock was cut. Part of the material as per list was purchased, and part was cut to rough sizes at machines, with spur cutter for length and clippers for width.

The estimate of loss was made by charging to the department the gross sizes of the various woods of different thickness, the same as we would if we sold the stock and were shipping it to a customer. The credit was given on the amount in feet of panels shipped, after going through the various stages of manufacture.

It included the loss sustained at the clippers and saws, cutting the log-run stock to rough sizes for glue

room, the loss sustained by bad gluing, the loss of material at saws trimming panels to net sizes, the loss of panels sanded through, damaged at sander or damaged on the way to shipping department.

We therefore have a correct percentage of loss, on the different woods used during this period, between the rough state of the material and the finished product shipped.

It will be noticed that the loss on mahogany is less than the average loss on other woods. This was purchased as nearly as possible to the sizes required for the panels on which it was used, from time to time, as needed.

The loss on whitewood is high, because we purchased a lot of what we thought to be cheap material for centres, which in the end proved to be expensive.

On some few items the loss is low, such as will be found with some thicknesses of basswood, birch, etc., because this stock was cut to rough sizes at machines; but the waste here cutting to size was much greater than on the log-run stock, for the reason that all defects that would not pass were cut out, so that probably in the end there was not much difference.

Some of the items, such as ¼-in. basswood, 1/16-in. birch, ⅛, 3/16, ¼ and 5/16-in. elm, ⅛-in. red oak, etc., were high, because the logs of poorer grade were cut into these thicknesses, as they were used for centers.

It would seem from this that we cannot safely figure on less than 40 per cent. waste, although we may not have this amount of waste on all kinds and all sizes of panels; again, the waste may be greater than 40 per cent. on some kinds, constructions and sizes.

The question is, on what lot of panels did we make a profit and on which a loss? We did not show much of a profit during the six months' period. We know we must have made a profit on some orders, but we do not know how much or which orders were the most profitable. We know we did not make a profit on some orders, but we do not know which orders were the least profitable or what price we should have obtained to secure the profit we were rightfully entitled to.

We did not follow each order separately, but we did follow some at different periods. We found quite a variation in the waste item, also the cost of manufacture, on similar orders put through at different periods. Our waste on quartered oak varied from 30 per cent. on some orders to 55 per cent. on other orders. We manufactured a quantity of large tops; here the waste was high, being reduced only because we were able to secure small sizes to work off the waste ends.

This cost item is not only a question of material and waste. It is also a question of methods used in manufacture, machinery, factory arrangements, etc. If one cost item is high, it is generally from one of the above reasons, and not altogether a matter of the difference in waste of material in different plants.

We generally find where there is a difference in the amount of waste in two plants, it is because the class of work manufactured either permits of the use of a lower grade of material, hence less waste, or a better grade of material, hence greater waste.—Veneers.

No man ever learned it all. No man ever knew too much about his business. There is always plenty more yet to be learned.

The Veneer Industry Across the Border

THE seven veneer-producing states across the border are Arkansas, Michigan, Wisconsin, Illinois, Kentucky, Indiana and Missouri. None of these states returned less than twenty-five million feet of veneer for the year 1911, according to a bulletin issued by the United States Department of Commerce.

The total quantity of wood used in the manufacture of veneers in the United States in 1911 amounted to 444,886,000 feet, log scale. This represents a decrease of 6.8 per cent. from the quantity reported in 1910, but an increase of 2 per cent. over the year 1909. The number of mills reporting in 1911 was 18 per cent. less than in 1909, but the average output per factory in 1911 was greater than in any other year. The average consumption was 684,000 feet, log scale, per mill in 1909; 848,000 in 1910, and 852,000 in 1911.

Red gum was the principal veneer wood cut. In no year did it constitute less than 30 per cent. of the total of the domestic woods. In 1910 it reached its highest mark, a little over 34 per cent., which was more than the combined amounts of any other four woods reported. The use of this wood probably has been the prime factor in bringing the veneer industry to the degree of importance it has attained. The largest increase in quantity used of any wood in 1911 was shown by white oak, which for the first time exceeded the consumption of yellow pine, cottonwood and maple.

Ten of the woods used for veneer showed an increase and only nine a decrease, notwithstanding the fact that the total was less than the year before. The largest reductions were for yellow pine and maple, amounting to over one-half of the total decrease. Of all woods, cottonwood, ranging from 30,000,000 to 34,000,000 feet during the five years, has remained most constant.

The greatest percentage of increase in use was shown for two kinds of veneer wood, but little used prior to 1911; namely, hemlock and Douglas fir. The latter, which grows only in the Western states, probably would have been called into requisition more extensively, for it is quite suitable for veneer, had it not been that the stumpage was too far distant from the principal veneer markets. Until lately there has been but slight incentive for the development of the industry in the Western states. With the exception of Spanish cedar, which is employed principally for cigar boxes, the foreign woods are mostly used for the best grade of cabinet work and bring high prices.

Relatively considered, the foreign species showed a much greater falling off from the preceding year than did the domestic woods. The decline of the former amounted to nearly 30 per cent., as against a little over 6 per cent. in the case of the latter. The decrease in the quantity of mahogany was over 45 per cent.—the largest reduction shown by any of the veneer woods. All of the other foreign woods generally fell off in slight amounts, excepting Circassian walnut, which showed a market increase.

It is said that 90,000,000 broom handles are used annually in the United States; one for each man, woman and child.

The article, "The Mahogany of Western Africa," published in our November issue, was reproduced by courtesy of the Grand Rapids Furniture Record Company, Grand Rapids, Mich, who kindly loaned us the cuts for this purpose. The customary credit was inadvertently omitted through an oversight.

Mahogany and Oak

By J. C. T., in Veneers

THE subject of the offering in some of the furniture stores of mahogany and quartered-oak furniture of the same pattern at the same price, was under discussion by a group more or less interested in the matter. One man made the point that the result of this kind of an offering was to boost the sale of mahogany at the expense of oak, for ordinarily when two pieces of furniture of the same pattern are offered to a buyer at the same price, the name mahogany carries weight enough to give it the preference over quartered oak. One explanation of this is (even though oak is pretty high in price, it is not as high as mahogany) that the amount of wood entering into an article of furniture does not constitute enough of the total cost of the finished article for a little bit of difference in price between two kinds of wood to make any appreciable difference in the cost of the finished piece of furniture. Thus, if mahogany does cost a little more than oak when bought by the thousand feet, there is not enough difference in the cost of the amount entering into one piece of furniture to make any but a very small percentage in addition to the furniture cost.

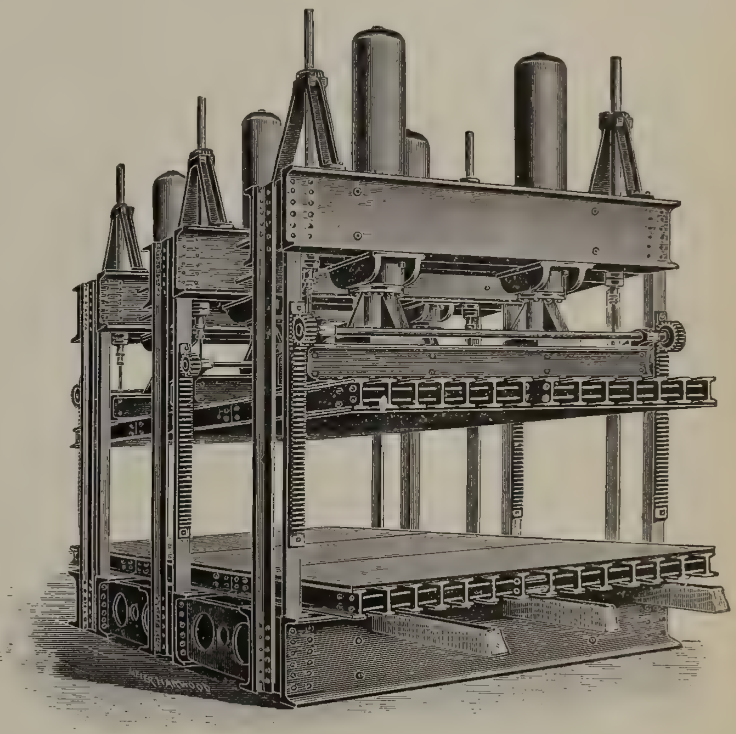
Another in the group offered this explanation: That plain rotary-cut mahogany veneer, or even slice-cut should not really cost any more than quarter-sawed oak. He pointed out that to get the highest grade article in quartered-oak veneer one must saw the stock, and at least half of the material, and generally more, is wasted in sawdust, so that the amount of veneer gotten out of an oak flitch in this way is so much less in quantity, compared to the amount of mahogany that can be gotten out of a flitch of the same size, that though the mahogany flitch would cost more in the beginning, the mahogany veneer really should not cost quite as much as the quarter-sawed oak.

This viewpoint is a reminder that while this equal price on mahogany and quartered-oak furniture of similar pattern is made, there is offered what might be termed the lowest grade of good mahogany furniture alongside the very highest grade of quartered oak. To many people mahogany is mahogany, and it is the name mahogany that appeals and leads to the purchase of furniture made of it, with out much thought being given to discriminations between the plain or cheap varieties in mahogany and the highly figured and expensive wood. There is really a much wider range in values in mahogany than there is in oak. There is some mahogany veneer that is worth two or three, and even four or five times as much as other mahogany veneer, and there are some pieces of mahogany furniture that stand out conspicuously high in price as compared with others of the same wood. The range of difference here is much wider than that in either quartered or plain oak.

It all brings out this thought, too: that the splash line in quartered oak, which makes it valuable as a figured wood, makes it necessary to saw the veneer to get the very highest grade article, and this is expensive. With mahogany there is not this splash line or anything of a similar nature to contend with, consequently while one may get a superior article of mahogany veneer by sawing it, the degree of superiority is not great enough to justify in many cases, so it is seldom done. The majority of mahogany veneer is cut, and, by virtue of cutting instead of sawing, manufacturers are able to make the same quantity of mahogany logs go farther and produce more veneer than can be produced from an equal quantity of oak logs where the saw is used in making veneer.

Inverted Hydraulic Veneer Presses

The Canadian Boomer & Boschert Press Company, Limited, of Montreal, have issued an interesting catalogue descriptive of their inverted hydraulic veneer press. This company who are the manufacturers of hydraulic nuckle joint and power screw presses for practically every purpose where pressing is required, was organized six years ago for the purpose of manufacturing a full line of presses as have been put on the market by the Boomer & Boschert Press Company, of Syracuse, N.Y., an arrangement having been entered into for the use of all designs as made by the latter company. Since commencing operations the entire capacity of this enterprising company has been taken up by the manufacture of pulp mill specialties, which has not permitted of their entering in the veneer field to the extent to which they would have liked. During the past



Inverted hydraulic veneer press of the Canadian Boomer & Boschert Press Company, Limited, Montreal

year, however, they have materially increased their capacity through the erection of a large extension to their plant and are now prepared to undertake to supply the veneer manufacturers' demands for presses. They manufacture presses for practically every kind of material for which a press is required, such as pulp, paper, cotton, rubber, mica, etc. Their line of veneer presses is a very large one indeed, consisting of both power screw and hydraulic in all sizes, and styles from a 36-inch square, 60-ton power screw to 100-inch x 180-inch, 1,000-ton inverted hydraulic. Their reputation for high-class work is indeed known all over the country and readers interested in the inverted hydraulic veneer press are invited to communicate with the firm and secure their illustrated C-1 bulletin, which contains an excellent cut of this press. In a pamphlet of this description, it of course, would be quite impossible for them to illustrate their full line of styles and sizes but special designs to suit the requirements of all manufacturers are submitted upon request, together with full specifications. Bulletin C-1 which partly describes this line of manufacture will be sent to any correspondent.

Three-Ply Wood for Door and Furniture Making

FROM time to time enquiries reach us from other countries regarding the facilities at the disposal of Canadian manufacturers for the output of various kinds of woods. Not all of these enquiries come from distant parts of the world; it is interesting to note, however, that agents in Australia are desirous occasionally of getting in touch with the more prominent of our dealers with a view to the supply of woods for furniture manufacturing and other purposes. The latest of these enquiries to come under our notice is one from a firm in Australia requesting that we furnish the names and addresses of manufacturers in a position to supply this kind of material. This Australian firm is anxious to get in touch with good dealers in three-ply wood suitable for door and furniture manufacturing, etc. The possibilities for opening up and developing a lucrative trade between Canada and Australia are very bright, judging by the remarks of our Australian correspondent, who is convinced that there should be a demand equally as good for the Canadian manufacturer's wood products as that of any other manufacturer. Full particulars are requested regarding shipping, prices, samples, etc., and for any firm not already represented in Australia it is of the utmost importance that samples should be submitted with prices in order to make business transactions possible. We might add that this firm is desirous of sending samples of woods such as they require and also further information for the use of firms who are in a position to open up an extensive and at at the same time profitable trade with the sister Dominion.

White Pine Stock Wanted for New Patent Shade Roller

WITH a view to manufacturing window shade spring rollers in Canada, Mr. C. K. Snavely, of New York City, is desirous of obtaining materials of a good grade white pine for his patent roller. This new roller, models of which have been made, has been tested with most satisfactory results. It is locked or stopped by a steel ball—not by a racket. A new feature in this patent roller is that it is the only true ball-bearing shade roller on the market, turning as it does on a ring of hard steel balls. It is claimed for this roller, which is enclosed, dust and raval proof, that it can be manufactured and sold to meet competition of the best high grades.

The requirements for the wood stick bored to contain the spring in the different sizes are as follows: diameter of the stick 15-16-inch, lengths 39-in. to 43-in., bored ⅝-in. diameter and 12-in. deep; one inch, lengths 39-in. and 48-in., bored 11-16-in. diameter to 13-in. deep; one and an eighth inch diameter, 42-in. and 48-in. long, bored ¾-in., and 16-in. deep; one and a-quarter diameter, 42-in. to 66-in long, bored ⅞-in. diameter, and from 16-in. to 18-in. deep. There are also required white or spruce pine sticks, laths or slats (variously named) to be used in the bottom hems of the window shades. These are made ⅞-in. wide, lower edge ¼-in. rounded, top edge ⅛-in. flat; also 1-in. wide, lower edge ⅜-in. rounded, top edge, 3-16 in. flat. The ⅞-in. sticks are made 42-in. long, the 1-in. sticks are made 54-in. long. Other sizes longer, wider and thicker are used for the extra size shades, but in smaller quantities. All these sticks—the roller blanks and slats for hems should be kiln and air-dried and straight; tied up in bundles of convenient size.

There are also required from birch or maple or other suitable straight-grained hard or semi-hard wood, spindle or dowel rods. These may be made from waste or short pieces, say twelve to thirty-six inches long, and 5-16-in., ⅜-in. and ½-in. diameters—largest requirement in the 5-16-in. diameter. These ought also to be thoroughly dry and stay straight. They may be tumbled to a fair degree of smoothness in talc or in plumbago; if cut to sizes otherwise furnished in dowel rods of three feet lengths as they come from the machines and tied up in suitable packages, or packed in crates or cases for shipment. The materials described are in shapes for immediate use in making the shade rollers by assembling the springs and other metal parts and finishing.

Mr. Snavely informs us that he has found no sources for supplies of this kind. It seems probable that they are not made as a trade product. There may, however, be mills in our territory, equipped with some at least of the necessary machinery for turning and boring the blanks and making the shade slats by moulding machine or otherwise. Supplies in crude form, that is to say, the shade roller pickets, squared for turning and in bundles or "shorts" of suitable thickness, say 1-in. to 1½-in., and of legnths say from 42 inches up—the shorter pieces in the 1-in. woods—may also be made, whilst in the hard woods, perhaps short pieces three feet long and upwards, straight in grain and dry, can be used. So much for the materials desired in wood. There is also a question regarding the sheet metal stampings for the hangers or brackets, cups, ends, etc. Sources are desired, for instance, from mills or factories now equipped to punch out these small parts from sheet steel from .010 to .0375 to .05 to the special forms required; also in malleable castings of these smaller parts like the brackets, spears, etc., to form. Machinery for die-making—viz., punching and forming sheet steel and also a gudgeon machine for shaping soft steel rods to forms, will be required. Spring wire of suitable gauge, say, .0375 x .024 and .045 x .04 in coils, spring tempered. Brass, steel or aluminium ferrules of various sizes, say 5/16-in. x 1/4-in., 3/16-in. hole, 7/16-in. x 3/8-in. - 1/4-in. hole for the spindles and open or closed ferrules covering the spring end of the roller, and a cap for the opposite end, fixed with a gudgeon, will also be needed. Specifications and samples will be supplied any one interested.

It is possible that Mr. Snavely would be interested in making window shades and shade cloths, having had more than twenty-five years' experience with the largest houses in the United States, and is an expert in this line, not only in manufacturing, but also in selling, etc. He is well known among the trade in New York city and other large centres.

Anyone interested may obtain Mr. Snavely's address on application to the Editor of the Canadian Woodworker.

Publications Received

Practical Patternmaking (price $2.00), by F. W. Barrows, a copy of which we have received from the Norman W. Henley Publishing Company, New York City, is the second edition, revised and enlarged, of a volume that has been found particularly useful and instructive to the trade. The author has had thirty years' experience as a patternmaker and so has an intimate knowledge of the kind of information that is really helpful to the practical man. The book contains information on pattern-making and pattern-makers in general, together with a detailed description of the necessary materials and how to use them. The various tools are discussed at length and there are special chapters on the lathe, the band saw and the circular saw, with examples of actual work. There is a complete section of illustrated examples of pattern work in wood. The cost, marking and record of patterns are explained carefully.

The representative of a well-known trade paper wrote a letter the other day soliciting an advertisement, and this is one of the points he made: "We guarantee a bonyfied circulation of 5,000 paid subscriptions." Did he get the ad? He did not.

Some Things a Boy Should Know About Woodworking

What a boy ought to know about woodworking on entering high school after two years' elementary technical training is told by Joseph Berg in a late number of the Manual Training Magazine. He says the boy will be properly informed and make a good student if he knows:

How to read a rule (not ruler).
How to add and subtract fractions of an inch.
That sandpaper is graded numerically, the average being No. 1.
The correct method of tearing sandpaper.
That a block should be used when sanding flat unfinished surfaces.
That sandpaper should be torn into rectangular pieces to fit block.
That a sandpaper block should always be of soft wood.
That no sanding should be done until all tool work is finished.
That worn sandpaper becomes useful later.
To call a bit by name and size.
That a bit is not a bore.
That a bit is not a drill.
That the figure "9" on a bit means 9-16 inch, not No. 9.
That a brace is not an "auger" or "borer."
That bits should never be filed on outside.
That bits should never be filed by pupils.
That direction should not be reversed when drawing out bit.
That a properly filed bit needs little pressure.
That holes are generally measured centre to centre.
That the use of a file be avoided wherever possible.
That a file when used cuts only one way.
That grinding without water heats to a blue and destroys temper.
That "sharpen" does not mean "grind."
Never use centre of oilstone or grindstone for narrow tools.
That flat side of plane blade or chisel should never be ground.
That flat side of plane blade or chisel should never be raised when whetting.
To lay the plane on its side to avoid dulling blade and cutting bench.
That the cap iron, for bench work, should be set about 1-16 inch from edge.
That a modern iron jack-plane is not a scrub-plane, as the old-fashioned wooden one was.
That the plane should not be held diagonally, except when cutting across the grain.
That good work is impossible with dull tools.
That the scraper should be reserved for curly grained wood.
That the sharpening of a scraper should not be done by pupils.
How a rip-saw differs from a crosscut-saw.
That the number on a saw indicates number of teeth per inch.
That a rip-saw is not always numbered 8 and a crosscut-saw 10.
That the hack-saw be reserved for close work.
That it is necessary to have a line squared across two adjacent faces to cut off square.
That no time or labor is saved by sawing around the piece.
That a large chisel will do better work than a small one.
That chisel across the grain is possible and correct in many cases.
That a mallet should not be used except for heavy duty.
To watch the chisel edge, not the handle, when using mallet.
That mallet or hammer should be held one-third the handle length from end.
That a bevel should not be called a "bevel square."
That screws should never be driven without first boring through top piece.
That size of bit is determined by gage of screw.
What "toe-nailing" means.
That a nailset is not a clamp.
How to adjust a handscrew.
That a vise will hold the work without placing entire weight on handle.
That "the more glue, the stronger" is a mistaken idea.
That a loose joint with much glue is weaker than a tight one with less glue.
That a thick glue is worse than none.
That shellac does not dry in half an hour, as is generally believed, it merely sets.
That "Sawdust and Glue" is a poor workman's motto.
That shellac must be thin and applied quickly.
That the work must be handled the same day, if possible.
That wood filler is not intended to fill bad joints and ruts on surface.

Thomas Chaterby, 1132 Treacy Avenue, Newark, while walking around barefooted in his house Sunday night, September 7th, to see if the windows were fastened, stepped on a floor which he had varnished last winter. Before he could realize his danger and spring clear he had stuck fast, his feet permanently glued to the boards. The doctors say that amputation of the feet will not be necessary to get him loose. They say that carpenters can be hired to saw out the section of flooring on which he stands, and the boards adhering to his feet can then be planed off.—Newark Evening News.

A project is under way for the establishment of a new furniture factory at Saskatoon. Mr. Frank Giddings, who is behind the proposal, is having plans prepared for the proposed building. Eastern capital is said to be interested.

Trade Happenings and Opportunities

Mr. C. H. Anthony has started a woodworking business at Swift Current, Sask.

Gagnon & Charbonneau, furniture manufacturers, Montreal, have been registered.

Taschereau & Frere, manufacturers of handles, Plessisville, P.Q., have dissolved partnership.

The Parsons Motor Car Company of Canada, Limited, intend building a plant at Windsor, Ontario.

Plans have been drawn for a new auto factory at Berlin, Ont. It will be one storey, 250 x 250 feet.

McMillan & Saunderson, of Truro, N.S., report that their carriage works are operating to full capacity.

The Farquharson-Gifford Company, of Stratford, Ont., have about completed their new four-storey factory.

The premises of the Montreal Wood Mosaic Flooring Company, St. Catherine Street West, have been badly burned.

The Brittain-Plewes Company, Limited, Redcliffe, Alta., has changed its name to the Redcliffe Woodworkers, Limited.

The National Furniture Company, of Berlin, Ont., have been granted an extra-provincial charter in British Columbia.

The Pickering Wheel Company, of Westmount, Que., will install a wood finishing plant in the second storey of their factory.

The A. J. Reach Company have completed their new sporting goods factory at Brantford, Ont. It is two storeys, 147 by 46 feet.

Caron & Raymond have registered at Montreal as sash and door manufacturers. The partners are Edgar Caron and Eugene Raymond.

John Clark, vice-president of the firm of McDiarmid & Clark, Limited, manufacturers of sash and doors, of Brandon, Man., died recently.

On December 11th fire brike out in the St. Catherine Street store of the Montreal Wood Mosaic Floor Company, causing damage to the extent of about $2,500.

Sommers Bros., of Saginaw, Mich., who have been considering the erection of a match factory at Sarnia, Ont., have abandoned the site and will locate in Chatham, Ont.

Murray's box and basket mill at Hansport, N.S., is undertaking extensive changes, and new machinery is being added to meet the demands of the growing business.

Marcil & Lamarre have been registered to carry on business as manufacturers of brooms and brushes, at St. Michel, P.Q. The partners are Louis Marcil and Hector Lamarre.

The sash and door factory owned by Mr. A. Bourque, at St. Cyrille de Wendover, P.Q., has been totally destroyed by fire. The loss of $15,000 is only partially covered by insurance.

The Napierreville Lumber Manufacturing Company, Limited, has been organized with a capital of $49,000. They will erect a sash and door factory and woodworking plant at Napierreville, Que.

The Erie Basket Company, Limited, of Leamington, Ont., is seriously considering moving its heading, stave and basket plants to Hickman, Ky. Representatives of the company recently visited Hickman for the purpose of making

Largest Shavings and Sawdust System in Ontario. Designed and put in operation by our engineer

arrangements for a site, and it is understood that satisfactory terms were offered which will probably take the company south.

The Nova Scotia Car Works, Halifax, N.S., have received several orders and the plant will start up immediately. The orders given are sufficient to keep the works in operation till the middle of March.

The annual convention of the Hardwood Manufacturers' Association will be held at the Gayoso Hotel, Memphis, January 21-22 next. The president, Mr. W. E. Delaney issues a special invitation to consumers of hardwoods.

Davis & Doty, Oakville, Ont., are considering plans for the erection of a planing mill which will be 45 x 100 feet, of brick construction. The machinery will be operated by electricity and the company will require electric motors.

The L'Original Stave and Lumber Manufacturing Company, Limited, has been incorporated with a capital of $145,000. The incorporators are T. Riufret, K.C., and A. R. W. Plimsoll, Montreal. The head office is at L'Original, Ont.

A. G. Spalding & Bros., of Chicopec, Mass., are contemplating the erection of a factory at Brantford, Ont., next year, for the manufacture of gymnasium equipment, etc. They have leased temporary quarters at 43 Dalhousie street.

A box factory is to be established in Abbotsford, B.C., by parties from Chehalis, Wash., who have contracted with the Imperial Powder Company for at least 5,000 boxes a month. The plant is to be in operation early in the spring.

The erection of the proposed auto factory at St. Catharines, Ont., by B. H. Goodrich Company, of Akron, Ohio, has been postponed owing to the fact that the company was not satisfied with the site of location allotted them by the city.

The contract has been awarded for the extension of the factory of the Massey-Harris Company, Limited, at Brantford. The addition will be one storey, 66 x 100, of sandlime brick construction—felt and gravel roof; electric light and iron frames. The cost will be $3,500.

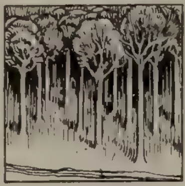
The Scotstown Manufacturing Company are running their chair factory and are now employing over twenty hands. It is not expected, however, that the entire plant will be running to capacity until the spring. It is expected that the company will put some shares on the market shortly.

The Fort Qu'Appelle (Saskatchewan) Boat Building and Wood Manufacturing Company expect to erect a $42,000 planing mill. The building will include woodworking shop, boat-building shop and planing mill, and will be largely of brick and concrete construction.

The Cedar Cove sash and door factory, Limited, Vancouver, has enjoyed a brisk fall trade, local orders having kept up remarkably well despite the material falling off in building activity. A large corporation order for sidewalk planks kept the sawmill busy for some weeks.

On November 26th fire broke out in the furniture factory of Walker & Clegg, Wingham, Ont., causing a loss of about $10,000. The factory was filled with Christmas stock and many large shipments on order for the holiday season would have been completed shortly. The company plan to erect a large new brick factory at an early date.

The annual furniture exhibition at Stratford will be held this year from January 12th to 24th in the new Farquhar-Gifford factory, when it is expected that buyers will be present from all over Canada. The following factories will exhibit: McLagan Furniture Company, Stratford Manufacturing Company, Frame & Hay Fence Company, Globe-Wernicke Company, Stratford Desk Company, Imperial Rattan Company, Stratford Chair Company, Classic Furniture Company, and the Stratford Bed Company.



INDIANA HARDWOODS

The "Canadian Woodworker" Buyers' Directory

For Alphabetical Index see page 28

AUTOMATIC DOVETAIL GLUE JOINTER
Canadian Linderman Machine Company, Woodstock, Ont.

BABBIT METALS
Canada Metal Company, Toronto.
Fay & Egan Co., J. A. Cincinnati, Ohio.

BALL BEARINGS
Chapman Double Ball Bearing Co., Toronto.

BALUSTER LATHES
Canada Machinery Corp., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Ober Mfg. Company, Chagrin Falls, Ohio.
Whitney & Son, Baxter D., Winchendon, Mass.

BAND SAW FILING MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., J. A. Cincinnati, Ohio.
Fox Machine Co., Grand Rapids, Mich.
Pryibil Machine Co., P., New York City.
Sinker-Davis Co., Indianapoils, Ind.

BAND SAWS
Buss Machine Works, Holland, Mich.
Canada Machinery Corp., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Fox Machine Co., Grand Rapids, Mich.
Preston Woodworking Machinery Company, Preston, Ont.
Pryibil Machine Co., P., New York City.
Sidney Tool Company, Sidney, Ohio.
Williams Machinery Co., A. R., Toronto.

BAND SAW MACHINES
Canada Machinery Corp., Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Fox Machine Co., Grand Rapids, Mich.
Pryibil Machine Co., P., New York City.
Sidney Tool Co., Sidney, Ohio.
Wardwell Mfg. Co., Cleveland, Ohio.
Williams Machinery Co., A. R., Toronto.

BAND SAW STRETCHERS
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.

BENDING MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.

BELTING
Fay & Egan Co., J. A., Cincinnati, Ohio.
Federal Engineering Co., Toronto.
Martin & Co., W. A., Toronto.

BLOWERS
Cyclone Blow Pipe Co., Chicago.
Mahoney, A., Toronto.
Ormsby, A. B., Toronto.
Sheldons, Limited, Galt, Ont.
Toronto Blower Company, Toronto.
U. S. Steel Tank & Pipe Co., Chicago, Ill.

BLOW PIPING
Cyclone Blow Pipe Company, Chicago.
Mahoney, A., Toronto.
Ormsby, A. B., Toronto.
Sheldons, Limited, Galt, Ont.
Toronto Blower Company, Toronto.
U. S. Steel Tank & Pipe Co., Chicago.

BOILER INSPECTION
Boiler Inspection & Insurance Co., Toronto.

BORING MACHINES
Canada Machinery Corporation, Galt, Ont.
Chicago Machinery Exchange, Chicago.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Fox Machine Co., Grand Rapids, Mich.
Nash, J. M., Milwaukee, Wis.
Porter Machinery Co., C. O., Grand Rapids, Mich.
Preston Woodworking Machinery Company, Preston, Ont.
Pryibil Machine Co., P., New York.
Sidney Tool Company, Sidney, Ohio.
Williams Machinery Co., A. R., Toronto.

BOX MAKERS' MACHINERY
Canada Machinery Corporation, Galt, Ont.
Canadian Linderman Machine Comapny, Woodstock, Ont.
Chicago Machinery Exchange, Chicago.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Whitney & Son, Baxter, D., Winchendon, Mass.

CABINET PLANERS
Buss Machine Works, Holland, Mich.
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Pryibil Machine Co., P., New Pork City.

CARS (Transfer)
Sheldons, Limited, Galt, Ont.

CARVING MACHINES
Canada Machinery Corporation, Galt, Ont.
Chicago Machinery Exchange, Chicago.
Curtis Machinery Corporation, Jamestown, N.Y.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Porter Machinery Co., C. O., Grand Rapids, Mich.

CLAMPS
Adjustable Clamp Co., Chicago, Ill.
Batavia Clamp Co., Batavia, N.Y.
Black Bros. Machinery Co., Mendota, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Francis Co., Chas. E., Rushville, Ind.
Preston Woodworking Machinery Company, Preston, Ont.
Simonds Canada Saw Company, Montreal, P.Q.

COLUMN CLAMPS
Black Bros. Machinery Co., Mendota, Ill.

COLUMN MACHINERY
Curtis Machine Corporation, Jamestown, N.Y.
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.

CUT-OFF SAWS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, Ohio.
Porter Machinery Co., C. O., Grand Rapids, Mich.
Pryibil Machine Co., New York.
Sidney Tool Co., Sidney, Ohio.
Simonds Canada Saw Co., Montreal, P.Q.

CUTTER HEADS
Berlin Machine Works, Hamilton, Ont.
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Fox Machine Company, Grand Rapids, Mich.
Shimer & Sons, Samuel J., Galt, Ont.

DADO HEADS
Elliott, W. A., Toronto.
Fox Machine Company, Grand Rapids, Mich.

DOVETAILING MACHINES
Advance Machinery Co., Toledo, Ohio.
Canada Machinery Corporation, Galt, Ont.
Chicago Machinery Exchange, Chicago.
Canadian Linderman Machine Company, Woodstock, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

DOWEL MACHINES
Canada Machinery Corporation, Galt, Ont.
Chicago Machinery Exchange, Chicago.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, Ohio.

DRY KILNS
Grand Rapids Veneer Works, Grand Rapids, Mich.
Morton Dry Kiln Co., Chicago, Ill.
Sheldons, Limited, Galt, Ont.
Standard Dry Kiln Co., Indianapolis, Ind.

DUST COLLECTORS
Cyclone Blow Pipe Co., Chicago, Ill.
Ormsby, A. B., Toronto.
Sheldons, Limited, Galt, Ont.
U. S. Steel Tank & Pipe Co., Chicago, Ill.

DUST SEPARATORS
Cyclone Blow Pipe Co., Chicago, Ill.
Sheldons, Limited, Galt, Ont.

EDGERS (Gang)
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Co., Montreal, P.Q.
Williams Machinery Co., A. R., Toronto, Ont.

EDGERS (Single Saw)
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Co., Montreal, P.Q.

END MATCHING HACHINE
Canada Machinery Corporation.
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.

ENGINEERS' SUPPLIES
Morrison Brass Mfg. Co., Toronto, Ont.

ENGINES (Steam)
Sinker-Davis Co., Indianapolis, Ind.
Toomey, Frank, Inc., Philadelphia, Pa.

EXHAUST FANS
Cyclone Blow Pipe Co., Chicago, Ill.
Sheldons Limited, Galt, Ont.
U. S. Steel Tank & Pipe Co., Chicago, Ill.

FILES
Simonds Canada Saw Co., Montreal, P.Q.

FLOORING MACHINES
Canada Machinery Corporation, Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Whitney & Son, Baxter D., Winchendon, Mass.

FILING MACHINERY
Wardwell Mfg. Company, Cleveland, Ohio.

FILING ROOM OUTFITS
Wardwell Mfg. Company, Cleveland, Ohio.

FILLERS
Advance Paint Co., Indianapolis, Ind.
Marietta Paint & Color Co., Marietta, Ohio.
Sturgeons, Limited, Toronto, Ont.

FLUTING HEADS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Pryibil Machine Co., P., New York City.

FLUTING AND TWIST MACHINE
Pryibil Machine Co., P., New York City.

GAINING MACHINES
Canada Machinery Corporation, Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Williams Machinery Co., A. R., Toronto, Ont.

GLUE
Harris & Company, W., Toronto, Ont.
National Process Co., Indianapolis, Ind.
Perkins Glue Company, South Bend, Ind.

GLUE CLAMPS
Adjustable Clamp Company, Chicago, Ill.
Batavia Clamp Company, Batavia, N.Y.
Black Bros. Machinery Co., Mendota, Ill.
Francis Co., Chas. E., Rushville, Ind.
Palmer & Sons, E., Owosso, Mich.

GLUE HEATERS
Advance Machinery Company.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Fox Machine Co., Grand Rapids, Mich.
Francis Co., Chas. E., Rushville, Ind.

GLUE JOINTERS
Canada Machinery Corporation, Galt, Ont.
Canadian Linderman Co., Woodstock, Ont.
Chicago Machinery Exchange, Chicago, Ill.

GLUE SPREADERS
Advance Machinery Co., Toledo, Ohio.
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Francis Co., Chas. E., Rushville, Ind.

GLUE ROOM EQUIPMENT
Advance Machinery Co., Toledo, Ohio.
Francis Co., Chas. E., Rushville, Ind.

GLUING CAMP CARRIERS
Billstrom, Nels. J., Rockford, Ill.

GRINDERS (Cutter)
Fay & Egan Co., J. A., Cincinnati, Ohio.

GRINDERS (Knife)
Chicago Machinery Co., Chicago, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Fox Machine Company, Grand Rapids, Mich.

GRINDERS (Tool)
Fay & Egan Co., J. A., Cincinnati, Ohio.
Pryibil Machine Co., P., New York City.

GROOVING HEADS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Shimer & Sons, Samuel J., Milton, Pa.

GUARDS (Saw)
Porter Mach. Co., C. O., Grand Rapids, Mich.

GUMMERS, ETC.
Fay & Egan Co., J. A., Cincinnati, Ohio.

HAND PROTECTORS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Jones Safety Device Co., Hamilton, Ont.
Porter Mach. Co., C. O., Grand Rapids, Mich.

HARDWARE SPECIALTIES
Reflector & Hardware Mfg. Co., Chicago, Ill.

HAND SCREWS
Adjustable Clamp Co., Chicago, Ill.
Black Bros. Machinery Co., Mendota, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Grand Rapids Hand Screw Co., Grand Rapids, Mich.

HANDLE & SPOKE MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.
Ober Mfg. Company, Chagrin Falls, Ohio.
Sidney Tool Company, Sidney, Ohio.
Whitney & Son, Baxter D., Winchendon, Mass.

HARDWOOD LUMBER
Anderson & Co., C. G., Toronto, Ont.
Burkholder Lumber Co., S., Crawfordsville, Ind.
Crane & Company, Chicago, Ill.
Duhlmeier Bros., Cincinnati, Ohio.
Gotshall Mfg. Company., Toledo, Ohio.
Kosse, Shoe & Schleyer, Cincinnati, Ohio.
Long Knight Lumber Co., Indianapolis, Ind.
Powell Myers Lumber Co., South Bend, Ind.
Shiels & Co., Chas., F., Cincinnati, Ohio.
Spears & Lauder, Toronto, Ont.
Young & Cutsinger, Evansville, Ind.

HUB MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.

HYDRAULIC VENEER PRESSES
Black Bros. Machinery Co., Mendota, Ill.
Canadian Boomer & Boschert Co., Montreal.
Francis Co., Chas. E., Rushville, Ind.
Perrin & Company, Wm. R., Toronto, Ont.

JOINTERS
Buss Machine Works, Holland, Mich.
Canada Machinery Corporation, Galt, Ont.
Canadian Linderman Co., Woodstock, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Fox Machine Co., Grand Rapids, Mich.
Porter Mach. Co., C. O., Grand Rapids, Mich.
Wardwell Mfg. Company, Cleveland, Ohio.

KNIVES (Planer and others)
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Shimer & Sons, Samuel J., Milton, Pa.
Simonds Canada Saw Co., Montreal, P.Q.

LATHES
Canada Machinery Corporation, Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Fox Machine Company, Grand Rapids, Mich.
Ober Mfg. Company, Chagrin Falls, Ohio.
Porter Mach. Co., C. O., Grand Rapids, Mich.
Whitney & Son, Baxter D., Winchendon, Mass.

LUMBER
Atlantic Lumber Company, Toronto, Ont.
Anderson Lumber Co., C. G., Toronto, Ont.
Burkholder Lumber Co., S., Crawfordville, Ind.
Duhlmeier Bros., Cincinnati, Ohio.
East St. Louis Walnut Co., East St. Louis, Mo.
Evans Lumber Co., G. H., Chattanooga, Tenn.
Gotshall Mfg. Company, Toledo, Ohio.
Kosse, Shoe & Schleyer, Cincinnati, Ohio.
Long Knight Lumber Co., Indianapolis, Ind.
Scrim Lumber Co., W. G., Vancouver, B.C.
Shiels & Co., Chas. F., Cincinnati, Ohio.
Spears & Lauder, Toronto, Ont.
Timms, Phillips & Co., Vancouver, B.C.
Young & Cutsinger, Evansville, Ind.

MACHINE KNIVES
Simonds Canada Saw Co., Montreal, P.Q.
Walters & Sons, H., Hull, P.Q.

MITRE MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

MITRE CLAMPS
Adjustable Clamp Co., Chicago, Ill.
Batavia Clamp Co., Batavia, N.Y.
Black Bros. Machinery Co., Mendota, Ill.

MITRE SAWS
Canada Machinery Corporation, Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Co., Montreal, P.Q.

MORTISING MACHINES
Canada Machinery Corporation, Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.

MULTIPLE BOXING MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.

PAINTS & VARNISHES
Advance Paint Company, Indianapolis, Ind.
Jamieson & Company, R. C., Montreal, P.Q.
Marietta Paint & Color Co., Marietta, Ohio.

PANELS
Gorham Bros., Mt. Pleasant, Mich.

PATENT SOLICITORS
Dennison, H. J. S., Toronto, Ont.
Lightfoot, Stanley, Toronto, Ont.

PATTERN SHOP MACHINES
Canada Machinery Corporation, Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Whitney & Son, Baxter D., Winchendon, Mass.

PICTURE FRAME MACHINERY
Black Bros. Machinery Co., Mendota, Ill.
Canada Machinery Corporation, Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Fox Machine Company, Grand Rapids, Mich.

PLANERS
Canada Machinery Corporation, Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Porter Mach. Co., C. O., Grand Rapids, Mich.
Whitney & Son, Baxter D., Winchendon, Mass.

PLANING MILL MACHINERY
Black Bros. Machinery Co., Mendota, Ill.
Canada Machinery Corporation, Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Fox Machine Co., Grand Rapids, Mich.
Porter Mach. Co., C. O., Grand Rapids, Mich.
Pryibil Machine Co., P., New York City.
Shimer & Sons, Samuel J., Milton, Pa.
Sidney Tool Co., Sidney, Ohio.
Whitney & Son, Baxter D., Winchendon, Mass.
Williams Machinery Co., A. R., Toronto, Ont.

PRESSES (Veneer)
Black Bros. Machinery Co., Mendota, Ill.
Canadian Boomer & Boschert Press Company, Montreal, Que.
Francis Co., Chas. E., Rushville, Ind.
Perrin & Co., Wm. R., Toronto, Ont.

PULLEYS
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Williams Machinery Co., A. R., Toronto, Ont.

RESAWS
Canada Machinery Corporation, Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Co., Montreal, P. Q.
Sinker-Davis Co., Indianapolis, Ind.
Williams Machinery Co., A. R., Toronto, Ont.

RIM AND FELLOE MACHINERY
Canada Machinery Corporation, Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.

RIP SAWING MACHINES
Canada Machinery Corporation, Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.
Preston Woodworking Mach. Co., Preston, Ont.
Pryibil Machine Co., P., New York City.
Sidney Tool Co., Sidney, Ohio.
Sinker-Davis Co., Indianapolis, Ind.
Williams Machinery Co., A. R., Toronto, Ont.

ROUTING MACHINES
Kelley Electric Machine Co., Buffalo, N.Y.

RUBBING MACHINES
Curtis Machine Corporation, Jamestown, N.Y.

SAFETY GUARDS
Porter Mach. Co., C. O., Grand Rapids, Mich.

SANDERS
Black Bros. Machinery Co., Mendota, Ill.
Canada Machinery Corporation, Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Curtis Machine Corporation, Jamestown, N.Y.
Elliot Woodworker Company, Toronto, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Nash, J. M., Milwaukee, Wis.
Ober Mfg. Company, Chagrin Falls, Ohio.
Pryibil Machine Co., P., New York City.

SANDPAPER
Black Bros. Machinery Co., Mendota, Ill.

SASH, DOOR & BLIND MACHINERY
Black Bros. Machinery Co., Mendota, Ill.
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Shimer & Sons, Samuel J., Milton, Pa.
Williams Machinery Co., A. R., Toronto, Ont.

SAWS
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Co., Montreal, P.Q.
Wood & Son, Fred, Toronto, Ont.

SAW GUARDS
Porter Mach. Co., C. O., Grand Rapids, Mich.

SAW SWAGES
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Fox Machine Co., Grand Rapids, Mich.
Simonds Canada Saw Co., Montreal, Que.

SAW TABLES
Canada Machinery Corporation, Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.

SCRAPING MACHINES
Chicago Machinery Exchange, Chicago, Ill.
Whitney & Sons, Baxter D., Winchendon, Mass.

SCROLL SAWS
Canada Machinery Corporation, Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Co., Montreal, P.Q.

SECOND-HAND MACHINERY
Chicago Machinery Exchange, Chicago, Ill.
Cleveland Billing & Machinery Co., Cleveland, Ohio.
Williams Machinery Co., A. R., Toronto, Ont.

SHAPERS
Buss Machine Works, Holland, Mich.
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Company, Chargrin Falls, Ohio.
Shimer & Sons, Samuel J., Milton, Pa.
Simonds Canada Saw Co., Montreal, P.Q.
Smith & Phillips Mfg. Co., Chicago, Ill.
Whitney & Sons, Baxter D., Winchendon, Mass.

SHELLAC
Advance Paint Co., Indianapolis, Ind.
Jamieson & Company, R. C., Montreal, P.Q.

SHAVING COLLECTORS
Cyclone Blow Pipe Co., Chicago, Ill.
Ormsby Company, A. B., Toronto, Ont.
Sheldons Limited, Galt, Ont.
United States Steel Tank & Pipe Company, Chicago, Ill.

SINGLE SPINDLE BOXING MACHINES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.

STAINS
Advance Paint Company, Indianapolis, Ind.
Jamieson & Co., R. C., Montreal, P. Q.
Marietta Paint & Color Co., Marietta, Ohio.
Sturgeons, Limited, Toronto, Ont.

STAVE SAWING MACHINE
Whitney & Sons, Baxter D., Winchendon, Mass.

STEAM TRAPS
Canadian Morehead Mfg. Co., Woodstock, Ont.

STORE FIXTURES & FITTINGS
Reflector & Hardware Specialty Mfg. Company, Chicago, Ill.

SURFACERS
Buss Machine Works, Holland, Mich.
Canada Machinery Corporation, Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Preston Woodworking Mach. Co., Preston, Ont.
Whitney & Sons, Baxter D., Winchendon, Mass.
Williams Machinery Co., A. R., Toronto, Ont.

SWING SAWS
Canada Machinery Corporation, Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, Ohio.
Preston Woodworking Mach. Co., Preston, Ont.
Simonds Canada Saw Co., Montreal, P.Q.

TABLE LEG LATHES
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Co., Chagrin Falls, Ohio.
Whitney & Sons, Baxter D., Winchendon, Mass.

TENONING MACHINES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Pryibil Machine Co., P., New York City.
Sidney Tool Company, Sidney, Ohio.

TRIMMERS
Canada Machinery Corporation, Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.

TRUCKS
Buss Machine Woks, Holland, Mich.
Canada Machinery Corporation, Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Standard Dry Kiln Co., Indianapolis, Ind.
Sheldons Limited, Galt, Ont.

TURNING MACHINES
Canada Machinery Corporation, Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.
Porter Mach. Co., C. O., Grand Rapids, Mich.
Pryibil Machine Co., P., New York City.
Sidney Tool Company, Sidney, Ohio.
Whitney & Sons, Baxter D., Winchendon, Mass.

UNDER-CUT SELF-FEEDING FACE PLANER
Chicago Machinery Exchange, Chicago, Ill.
Can. Mach. Corp., Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

UNIVERSAL WOODWORKING PLANER
Canada Machinery Corporation, Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Elliot, W. A., Toronto, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Hutchison, M., Toronto, Ont.
Sidney Tool Company, Sidney, Ohio.

VARNISHES
Advance Paint Co., Indianapolis, Ind.
Jamieson & Company, R. C., Montreal, P. Q.
Marietta Paint & Color Co., Marietta, Ohio.

VENEERS
Acme Veneer & Lumber Co., Cincinnati, Ohio.
Adams & Raymond Veneer Co., Indianapolis, Ind.
Black Lumber Co., Fred W., Chicago, Ill.
Central Veneer Company, Indianapolis, Ind.
Clark Veneer Co., Walter, Grand Rapids, Mich.
Dominion Mahogany & Veneer Co., Montreal, Que.
Goshen Veneer Company, Goshen, Ind.
Haughton Veneer Company, Chicago, Ill.
Hoffman Bros. Company, Fort Wayne, Ind.
Hossafous, H. C., Dayton, Ohio.
Huddleston-Marsh Lumber Co., Chicago, Ill.

VENEERS (contd.)
National Veneer & Lumber Co., Indianapolis, Ind.
Ohio Veneer Company, Cincinnati, Ohio.
Strong Veneer Company, Jamestown, N.Y.
Thompson Veneer Co., W. T., Edinburgh, Ind.
Veneer Manufacturers Co., Chicago, Ill.
Wabash Veneer Company, Wabash, Ind.

VENTILATING APPARATUS
Sheldons Limited, Galt, Ont.

VENEER PRESSES (Hand and Power)
Black Bros. Machinery Co., Mendota, Ill.
Canadian Boomer-Boschart Co., Montreal, Que.
Francis Co., Chas. E., Rushville, Ind.
Perrin & Company, Wm. R., Toronto, Ont.

VISES
Fay & Egan Co., J. A., Cincinnati, Ohio.
Simonds Canada Saw Company, Montreal, P.Q.

WAGON AND CARRIAGE MACHINERY
Canada Machinery Corporation, Galt, Ont.
Chicago Machinery Exchange, Chicago, Ill.
Fay & Egan Co., J. A., Cincinnati, Ohio.
Ober Mfg. Company, Chagrin Falls, Ohio.
Whitney & Sons, Baxter D., Winchendon, Mass.

WALNUT LUMBER
East St. Louis Walnut Co., East St. Louis, Ill.

WINDOW FRAME MACHINERY
Smith & Phillips Mfg. Co., Chicago, Ill.

WOODTURNERS
Ewing & Murphy, Toronto, Ont.

WOOD FINISHES
Marietta Paint & Color Co., Marietta, Ohio.
Sturgeons Limited, Toronto, Ont.

WORK BENCHES
Canada Machinery Corporation, Galt, Ont.
Fay & Egan Co., J. A., Cincinnati, Ohio.

WOOD PLUG MACHINE
Eagle Machine Works, Indianapolis, Ind.

WOOD SCREWS
Robertson & Company, P. L., Milton, Ont.

SPARTAN
ART WOOD STAINS

and SPARTAN PASTE FILLER

give supreme satisfaction both in their PRACTICAL working qualities and the resultant finish

Write for sample panels

The Marietta Paint & Color Co.
Marietta, Ohio.